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ABSTRACT

Provided is the final report of a 1961 study of non-applicants for National Science Foundation (NSF) sponsored institutes for secondary level science and mathematics teachers. Data are presented concerning biographical information, training and education, professional activities, attitudes, needs, motivations, and relevant school and community characteristics of the non-applicants. Analysis of the data is performed to suggest institute program improvements and modifications. (SL)

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AIR-C67-11/62-TR

A Study of Non-Applicants and Other Segments of the Secondary School Science and Mathematics Teacher Population

C-222

FINAL REPORT

AMERICAN INSTITUTE FOR RESEARCH

SE 023 916

AMERICAN INSTITUTE for RESEARCH

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A Study of Non-Applicants and Other Segments of the Secondary School Science and Mathematics Teacher Population

FINAL REPORT

David B. Orr

Submitted to

Division of Scientific Personnel and Education

National Science Foundation

Contract No.: NSF - C222

30 November 1962

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It is a pleasure to acknowledge the generous assistance of the many people who contributed to the Study and to this Report. The list is too long to name everyone, but recognition should go to the Regional Representatives (named in a previous report) for their interviewing; to the clerical staff under the able direction of Mr. Stuart E. Sherman; to the computer personnel, Mr. Wallace Knetz and Mr. Glenn Roudabush; to the Graphic Arts Department under Mr. Gil Dannels; to the long-suffering Project Secretary, Miss Solveig Morgenstierne; to many others who assisted from time to time; and most of all to the teachers and principals who so graciously consented to take part in the Study. Special thanks are tendered to the Project Monitor, Mr. Albert T. Young, Jr., for his interest and suggestions; to Dr. William A. Gorham, lately of the staff, for his work and his review of this Report; and to Dr. John T. Dailey, Executive Scientist and Program Director of the American Institute for Research, under whose supervision the Study was carried out, for his continued help and advice.

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A Study of Non-Applicants and Other
Segments of the Secondary School Science
and Mathematics Teacher Population

TECHNICAL REPORT

I. Introduction and Purpose

One of the major concerns of the National Science Foundation (NSF) is raising the level of secondary Science and Mathematics teaching in the nation's schools. To this end, the Division of Scientific Personnel and Education (SPE) has developed several programs providing opportunities for such teachers to increase their subject matter background and general scientific competence. Although some 75,000 opportunities for study had been provided for secondary Mathematics and Science teachers by the end of the 1960-61 school year, NSF personnel felt that its Teacher Training Programs were not attracting a sizeable group who might well profit from them.

In July 1961, the American Institute for Research (AIR) began a study designed to develop information about the non-applicant for these programs as contrasted to applicant-rejectees and applicant-attendees. Data were sought concerning biographical information; training and education; professional activities, attitudes, needs and motivations; and relevant school and community characteristics. Analyses were designed to provide information about non-applicants which might be significant for program improvements and possible modifications.

The purpose of this report is to present and discuss the findings of the study. Although the procedures of the study have generally been described in previous reports, they will be summarized below.

II. Procedures

A. Developmental Procedures. Instruments were developed to collect relevant data from a national sample of schools and their Mathematics and Science teachers. Copies of these instruments are found in the Technical Appendices. The teachers questionnaire and the interview schedule were both developed from materials gathered through study of prior reports, available data, and intensive interviewing of Summer and Inservice Institute participants and directors. The preliminary interviewing and related materials were described fully in a report entitled "Summary Report of Preliminary Interviewing" submitted as an attachment to Quarterly Report No. 1.

A field organization of about 60 professionals was constituted to do the interviewing and complete instructions and materials were supplied to each. In all cases, these Regional Representatives were required to carry out some of the initial interviewing personally. Afterwards they had the option of obtaining and supervising a capable assistant, subject to the limitation that they must make all initial contacts with the schools, and that they review and be responsible for the work of any assistant. A majority of the Representatives did their own interviewing.

B. Sampling. The basic document for the sampling was the U.S. Office of Education Directory of Public Secondary Day Schools, 1958-59 (published 1961). This list was supplemented by sampling state and federally supported secondary day schools from state directories. Private and parochial schools were drawn from lists supplied by the Office of Education and cross-checked against the latest available directories.

Public senior high schools were stratified according to four size categories. Within each category schools were placed in a contiguous state order reflecting the nine U.S. Office of Education Regions, and divided into "batches" of uniform size from each of which one school was selected randomly. This procedure insured regional representation. Junior high schools, private schools, and parochial schools were similarly ordered and one school drawn at random from each "batch". Overage was provided in anticipation of rejections and non-existent schools. Table II-1 shows the number of schools drawn in each category.

In order to preserve the regional representativeness, these samples were divided into interview and non-interview subsamples by consecutive pairing of each sample and use of a table of random numbers to assign one member of each pair to the interview subsample.

Table II-2 shows the extent of school participation, number of teachers, etc., by category of school. Elementary, disbanded, and otherwise ineligible schools were dropped from the study. Data loss by the computer reduced the indicated number of teacher questionnaires by ten, interviews by seven, and school questionnaires by one.

Table II - 1

Number of Schools Drawn by Category
(One drawn from each "batch")

	Batch Size	No. of Schools Drawn	
Public Senior High Schools			315
Category 1 (0-24 seniors)	105	62	
Category 2 (25-99 seniors)	80	110	
Category 3 (100-399 seniors)	40	86	
Category 4 (400+ seniors)	13	45	
Special*	*	12	
Junior High Schools	45		112
Parochial Schools	70		37
Private Schools	45		27
Total			491

*A few state-supported and otherwise unlisted public secondary schools were discovered. These were divided into groups by type and two drawn from each.

Table II-2
Number of Schools and Teachers and Their Participation

Category	Public 1		Public 2		Public 3		Public 4		Junior		Parochial		Private		Special		Total		
	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	Comb.
#Participating	23	22	46	52	41	40	23	24	47	48	17	17	10	11	3	3	210	217	427
#Non Responding	4	3	6	1		3			6	3		1	1	1	2	2	19	14	33
#Refusals				1	2				1	1							3	2	5
#Ineligible	5	5	2	2					2	5	1		2	2	1	1	13	15	28
Total in Sample	32	30	54	56	43	43	23*	24*	56**	57	18	18	13	14	6	6	245	248	493
#School Questionnaires received	22	19	42	41	39	38	21	18	48	46	18	17	9	10	2	4	201	193	394
Teacher Questionnaires Received	52	47	158	217	413	320	308	364	354	330	61	48	34	38	7	10	1387	1374	2761
#Teachers Reported	63	63	211	281	498	402	390	485	466	429	65	65	41	43	12	13	1746	1815	3561
#Interviews Received	57***		196.		346		291		344		62		32		9		1337		

*In each of these groups a sampled school split into two separate schools.

**One six year high school split into a 3-year senior high school and a 3-year junior high school

***About 2.8% of the expected number of interviews were not received. Most of these were cases of illness, mix-up and scheduling difficulties, retirements, and the like.

The sample of teachers consisted of all secondary Mathematics and Science teachers in the schools drawn.

C. Data Collection.

1. School Contacts. Each school in the sample received a letter on NSF stationery signed by Dr. Bowen Dees. The letter outlined the project and provided a stamped return envelope with a form on which the principal was asked to list those teachers teaching one or more secondary level courses in Mathematics or Science or regularly teaching such courses even though presently assigned to other duties. These lists formed the basic sample of teachers.

At intervals of several weeks, two follow-up letters were sent to each non-responding school. The extent of response, rejection, and non-response is shown in Table II-2.

2. Non-Interview Sample. Each teacher on the lists supplied by school principals in the non-interview (NI) sample was mailed a teacher questionnaire. Follow-up mailings were done periodically. Table II-2 shows the extent of participation of these teachers.

3. Interview Sample. Each teacher on the lists supplied by the school principals in the interview (I) sample was scheduled to be interviewed. Regional Representatives were instructed to call the schools and set up interview appointments.

As returns began to come in, it soon became apparent that the number of interviews would prove substantially larger than estimated. Thus the number of interviews in the largest schools was randomly cut to a maximum of 15, and the next largest and junior high schools to a maximum of 10. It was felt that these figures would provide sound samples of teachers from these schools.

As each teacher was interviewed, he was also left a stamped copy of the teacher questionnaire to fill out and return to the AIR office.

Regional Representatives submitted interview summaries of each interview (1 to 2 single-spaced, typewritten pages) covering the questions on the interview schedule. Interview summaries adjudged incomplete were returned for additional information. Representatives were instructed to report rather than interpret the subjects' responses.

After study of the preliminary materials, a school questionnaire to be filled out by the principal was also developed. These questionnaires were mailed to all principals of schools in the sample. Mail follow-up reminders were used. Table II-2 summarizes the returns for this questionnaire.

In order to allow time for the analysis, (before the contract extension) it was necessary that 7 May 1962 be set as a cutoff date for data collection. By this time all questionnaire non-respondents had received at least four contacts. It is possible that a relatively small number of non-respondents might have been secured through continued follow-up, but considerations of time and expense did not permit such intensive procedures, nor did the information likely to be gained appear to warrant them.

D. Analysis Procedures.

In planning the analysis for this report, a number of conditions were set up. The purpose of the analysis and report was seen as providing NSF personnel with information about application and non-application which might aid them in practical decisions regarding Program planning and/or modifications. Thus, the findings described are based upon content analyses, item distributions, and correlations, rather than complicated and obscure statistical procedures. The analyses were pointed toward the practical implications of the data. Much of the extensive data supplied in the Technical Appendices to this report has not been discussed below because of its peripheral relationship to the stated purposes of the study and report. Undoubtedly information on issues of interest to NSF personnel exists as a bonus in these data.

1. Weighting. Since the distribution of results in the sample is of little concern in itself, it was necessary to weight the distributions in such a way that they would provide estimates of the national population of secondary Mathematics and Science teachers in the groupings studied. Table II-3 shows the estimated number of schools and teachers in the nation for each of the eight types of schools. These figures agree well with estimates derived from other sources (Project Talent and NSF personnel) and suggest that the sample is a very good one.

Interview weights were computed for each school type to adjust for school non-response, differential sampling ratio, and teacher non-response as follows:

a. The percentage of school response within each type of schools was determined.

b. For each type, Step a. was combined with the appropriate sampling ratio by multiplying 1 over the percentage of school response times 1 over the sampling ratio.

c. The total number of teachers in the school type who responded was divided by the total number of teachers in the type. Multiplying 1 over this figure times the result in b. provided the weight.

d. The responses to each question were multiplied by the results in c. to estimate the population response.

Table II-3

Weighted Estimates of the Number of Schools and Secondary Science, and Mathematics Teachers in the Nation by School Type

School Type	No. of Schools*	No. of Teachers*
Public Senior		
Category 1 (0-24 seniors)	5450	15,500
Category 2 (25-99 seniors)	8470	42,800
Category 3 (100-399 seniors)	3500	38,600
Category 4 (400 + seniors)	630	11,100
Special	200	848
Junior High Schools	4740	45,600
Parochial	2520	10,400
Private	1030	4,280
TOTALS	26,500 (26,540)	169,000 (169,128)

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* These figures do not agree exactly with those presented in the Preliminary Report due to slight refinements in weighting and slight shifts in the categorization of the schools. They have been rounded to three significant figures, since it was only possible to carry the weighting and calculations to three significant figures.

There appeared to be little difference in the percentage of questionnaires returned by the interview and non-interview groups. Therefore, it was decided to combine the interview and non-interview questionnaire returns in order to provide additional stability for the results.

Questionnaire weights were computed similarly to pro-rate the questionnaire material to the entire national population of secondary Science and Mathematics teachers. The only difference was that in Step "c" above the percentage response of teachers was gotten individually by school rather than for the entire school type. This procedure produced individual weights for each school.

2. Analysis. The first step was to code all questionnaires and to have these punched for machine analysis. Write-ins were coded except the last question on the teachers questionnaire. This question was studied by examining a sample of 100 or so questionnaires and it was decided that it would not be profitable to analyze it. All other information on the questionnaires was coded, the IBM cards then were punched. Specifications for the analyses were prepared, submitted to NSF Personnel and revised.

Consideration of the preliminary results reported earlier (see the Preliminary Report, 31 March 1962), made it clear that a substantial number of teachers teach Math or Science only a small fraction of the time and may be considered to be primarily identified with another field such as English, Physical Education, and the like. These persons constitute a largely non-applicant group, almost certainly because of their lack of identification with the field. It was felt that the results of the study would be considerably "watered down" by combining this group with the other Mathematics-Science teachers. Therefore all those teachers devoting less than 40% of their time to teaching Mathematics or Science were sorted out and set aside from the "target group" analysis so that reasons for non-application in the main analysis would be more easily identified for a group closer to the NSF target population and more likely to respond to its programs.

Again on the basis of the preliminary results, the "target" group of teachers was further purified by eliminating the extremes of the age range. Teachers 56 or older and 24 or younger were eliminated on reasoning that the former would usually be too close to retirement to apply (or be selected), and the latter would usually be too fresh out of school to be interested. Thus a prime "target" group was identified as a group which has a major involvement in Mathematics and Science, and is in the optimal age range for application.

Since NSF personnel had expressed a good deal of interest in those teachers who teach Mathematics and Science less than 40% time, provision for the analysis of this group was included in the recent contract amendment. This group, called the "non-target" group, does not contain the over 40% time but out-of-age-range cases. It is composed simply of all cases teaching Math-Science less than 40% time regardless of age.

Because of the above definitions, Target and Non-Target groups do not together equal the total number of Math-Science teachers. Consideration was given to the analysis of the over-40%-time-but-out-of-age-range group, but this was rejected as being of little worth compared to the investment involved. Thus, the population estimates presented later in this report do not pertain to the entire population of Math-Science teachers, but are estimates only of the population who fit the definition of the group being studied at the moment.

As in the preliminary report three criterion groups were also identified, persons who had not applied for any of the NSF Teacher Training Programs in the last five years (NAs); those who had applied to one or more at some time during the last five years but had been rejected (ARs); and those who had applied and had been accepted at least once (AAs).

Tables II- 4, through II- 8 show the breakdown of the sample by criterion group and school type for the Target, Non-Target and Residual Groups of teachers, respectively. It can be seen that the sample sizes for some of the individual school types are quite small. It was therefore decided that three combined types: public senior highs, non-public highs and junior highs would be used in the analysis in order to improve the stability of the results. These combinations obscure some trends in the data, but appear necessary. The possibility of using all schools combined was examined, and rejected, since the additional stability did not appear to justify the combination of sometimes markedly different data.

3. Questionnaire Analyses. Material from the teacher questionnaire was analyzed according to the analysis specifications mentioned earlier. In general, those questions involving continuous, numerical variables were placed in correlation matrices and intercorrelated. Means, standard deviations and weighted Ns were also produced. Those questions involving categories or non-continuous variables were distributed separately for applicant-rejectees (ARs), non-applicants (NAs) and applicant acceptees (AAs). This treatment of the questions maximized the information obtainable from the computer within the resources of the project.

School questionnaire items were similarly treated.

In addition to the above, several matrices were set up to interrelate the various kinds of data collected. In one of these (Appendix C) selected school characteristics were treated as teacher characteristics and intercorrelated with other teacher characteristics including application for NSF programs. In another (Appendix F) the means of selected teacher characteristics for the teachers in a school were treated as school characteristics for that school and intercorrelated with other school characteristics. Finally (Appendix H) a matrix of interview responses and teacher characteristics was intercorrelated in order to

Table II-4

Weighted National Estimates of the Number of Teachers Teaching Science and Mathematics by School Category and Criterion Group

Category	AR		NA		AA		Combined **	
	Wt N	N	Wt N	N	Wt N	N	Wt N	N
Public Senior								
Cat. -1(0-24 seniors)	1,780	12	10,300	64	3,460	23	15,500	99
Cat. -2(25-99 seniors)	6,580	59	21,800	187	14,400	129	42,800	375
Cat. -3(100-399 seniors)	4,360	87	17,600	335	16,600	326	38,600	748
Cat. -4(400 + seniors)	1,430	81	4,940	287	4,730	282	11,100	650
Special*	340	4	260	10	60	3	660	17
Public Total	14,490	243	54,900	883	39,250	763	108,600	1,889
Parochial	890	10	6,340	61	3,210	37	10,400	108
Private	570	10	2,650	43	1,060	18	4,280	71
Non Public Total	1,460	20	8,990	104	4,270	55	14,700	179
Junior High Schools	6,420	94	28,200	426	10,900	163	45,500	683
TOTAL (All Schools)**	22,400	357	92,100	1,413	54,400	981	169,000	2,751

*Approximately 180 teachers were not included in the estimates since their proper criterion group was not known.

**Estimates of numbers of teachers were rounded because only three significant figures could be carried with the weights; thus, sub-totals may not exactly agree.

Table II-5

Estimated Number of Teachers Teaching Science and Mathematics by School Category and Criterion Group

TARGET GROUP*

Category	AR Wt N	AR N	NA Wt N	NA N	AA Wt N	AA N	Combined ** Wt N	Combined ** N
Public Senior								
Cat. -1(0-24 seniors)	994	7	4,620	28	2,588	17	8,200	52
Cat. -2(25-99 seniors)	4,710	44	9,140	81	12,380	110	26,200	235
Cat. -3(100-399 seniors)	3,300	66	10,022	190	14,020	273	27,300	529
Cat. -4(400 + seniors)	1,020	57	2,840	163	3,860	229	7,720	449
Special	316	3	108	5	52	2	476	10
Public Total	10,340	177	26,730	467	32,900	631	69,950	1,275
Parochial	518	6	3,300	32	2,840	32	6,660	70
Private	324	6	1,580	25	790	13	2,690	44
Non Public Total	842	12	4,880	57	3,630	45	9,350	114
Junior High Schools	5,430	78	16,220	247	8,680	131	30,300	456
TOTAL (All Schools)**	16,600	267	47,800	771	45,200	807	109,600	1,845

*Over 40% Time Teaching Mathematics/Science and Between 25 years old and 55 years old inclusive.

**Estimated number of teachers rounded to three figures so that sub-totals may not exactly agree.

Table II- 6

Estimated Number of Teachers Teaching Science and Mathematics by School Category and Criterion Group

NON-TARGET GROUP*

Category	AR Wt N	AR N	NA Wt N	NA N	AA Wt N	AA N	Combined ** Wt N	Combined ** N
Public Senior								
Cat. -1(0-24 seniors)	530	4	4,170	26	612	4	5,310	34
Cat. -2(25-99 seniors)	1,020	8	7,980	71	1,000	9	10,000	88
Cat. -3(100-399 seniors)	408	8	3,690	70	630	13	4,730	91
Cat. -4(400 + seniors)	66	4	770	46	128	7	964	57
Special	26	1	140	4	10	1	176	6
Public Total	2,050	25	16,750	217	2,380	34	21,200	276
Parochial	148	2	1,980	17	75	1	2,200	20
Private	0	0	910	15	[illegible]	1	965	16
Non Public Total	148	2	2,890	32	130	2	3,170	36
Junior High School	533	9	6,450	93	946	14	7,930	116
TOTAL (All Schools)**	2,730	36	26,100	342	3,460	50	32,300	428

*Teachers teaching Mathematics/Science less than 40% time.

**Estimates of number of teachers are rounded and thus sub-totals may not exactly agree.

Table II-7A

Estimated Number of Teachers Teaching Science and Mathematics by School Category and Criterion Group

RESIDUAL GROUP

Part A: More than 40% Time Teaching Mathematics/Science and Younger than 25 Years

	AR		NA		AA		Combined*	
	Wt.N	N	Wt.N	N	Wt.N	N	Wt.N	N
Public Senior								
Category 1 (0-24 seniors)	0	0	295	2	127	1	422	3
Category 2 (25-99 seniors)	211	2	1770	17	290	3	2270	22
Category 3 (100-399 seniors)	276	5	1310	27	322	6	1910	38
Category 4 (400+ seniors)	33	2	325	19	106	7	464	28
Special	0	0	0	0	0	0	--	--
Public Total	520	9	3700	65	845	17	5070	91
Parochial	116	1	538	7	0	0	654	8
Private	0	0	54	1	0	0	54	1
Non-Public Total	116	1	592	8	0	0	710	9
Junior High	51	1	1980	29	351	5	2380	35
TOTAL (All Schools)*	687	11	6270	102	1200	22	8160	135

* Estimates of number of teachers are rounded and subtotals may not exactly agree.

Table II-7 B & C

Estimated Number of Teachers Teaching Science and Mathematics by School Category and Criterion Group

RESIDUAL GROUP

Part B: More than 40% Time Teaching Mathematics/Science and Older than 55 Years

Category	AR		NA		AA		Combined*	
	Wt.N	N	Wt.N	N	Wt.N	N	Wt.N	N
Public Senior								
Category 1 (0-24 seniors)	254	1	254	2	0	0	508	3
Category 2 (25-99 seniors)	426	3	1460	12	645	6	2530	21
Category 3 (100-399 seniors)	254	5	2410	44	1230	27	3890	76
Category 4 (400+ seniors)	291	17	932	56	457	28	1680	101
Special	0	0	10	1	0	0	10	1
Public Total	1225	26	5070	115	2330	61	8620	202
Parochial	0	0	296	3	296	4	592	7
Private	244	4	108	2	162	3	514	9
Non-Public Total	244	4	404	5	458	7	1110	16
Junior High	281	4	2710	42	684	9	3680	55
TOTAL (All Schools)*	1750	34	8180	162	3470	77	13,400	273

PART C

A total of 9 AR's, 36 NA's and 25 AA's misanswered or omitted the age question. These account for approximately 600, 3780, and 1130 of the estimated number of teachers in the Residual Group.

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* Estimates of numbers of teachers have been rounded and their subtotals may not exactly agree.

Table II-8

Interview Analysis Sample Sizes
by Criterion Groups and Type of School as Analyzed

Group	AR	NA	AA	Combined
Target Group				
Public Senior High, Males	63	146	192	401
Public Senior High, Females	7	54	44	105
Non-Public High	4	24	19	47
Junior High, Males	34	60	40	134
Junior High, Females	9	34	12	55
Total	117	318	307	742
Non-Target Group				
Public Senior High	10	94	12	116
Non-Public High	---	16	1	17
Junior High	4	31	4	39
Total	14	141	17	172
Residual Group				
Public Senior High	23	178	76	277
Non-Public High	5	18	4	27
Junior High	14	90	8	112
Total	42	286	88	416
Grand Totals	173	745	412	1330

try to relate some of the motivational dimensions to the more descriptive characteristics of the teachers. The disparity of the various kinds of data employed in the above analyses undoubtedly obscured some of the relationships, but a good deal of information was derived from these approaches.

4. *Interview Analysis*. In the beginning, it was decided that rather than direct the course of the interviews to the coverage of a number of specific topics, the interviews would focus on broad topics and let themes emerge. This means that if the subject reported that a given reason (such as money) kept him from applying, it showed up in the analysis, *if not then it is not mentioned*. The advantage here is that the information collected represents the *subjects*' viewpoints and not the interviewer's biases. Thus, the fact that a given factor did not emerge is just as significant as if it had.

Work began on the development of a content classification scheme for the interview summaries as soon as a sufficient number had been received to study. A classification system was developed independently by two professionals based on a thorough study of 60-70 protocols. These two systems were then reconciled by the two professionals, with the Project Director and the Research Assistant chiefly responsible for reading the protocols taking part. Another 40-50 protocols were then read into the integrated system and further revisions made. By this time the system seemed very stable and was finalized. The chief orientation of the classification system, which was presented as an Appendix to the 31 March Report, is toward factual answers to the questions contained in the Interview Schedule; opinion was minimized.

5. *Interview Reliability*. Though a considerable amount of professional time was devoted to the development of the coding system for the interviews, it was felt necessary to check the intercoder consistency of the two persons who coded the protocols. The protocols were mixed up across time of receipt and Regional Representative and fifty papers were drawn to be coded by each coder. The consistency and error analysis presented below is based on these fifty papers.

Table II-9 presents the percentage of agreement, figured each of several ways, for each question coded in the interview analysis.

In this table Column A shows the percentage of *identical* judgments, where agreements that no codable response had been made are *excluded* from both numerator and denominator. This represents the most rigorous approach to consistency. Column B uses the same base but includes *partial* agreements (agreement as to the main category but not the subcategory) as well as identical agreements.

Column C shows the percentage of *identical* agreements *including* zeros (no codable responses) based upon all possible responses for the question (50, 100, or 150, depending on the number of responses coded for the question). If *partial* agreements are included, over the same base, Column D is obtained.

Table II - 9

Reliability Data for Interview Coding

Ques.	# Resp. Coded	A	B	C	D	E	F	G	H	I
A-1	2	.63	.76	.69	.80	.72	.79	.92	.82	.93
A-2	1	.84	.84	.84	.84	0.0	.84	.84	.84	.84
A-3	3	.62	.75	.73	.83	.69	.79	.92	.85	.95
A-4	3	.63	.72	.81	.85	.82	.86	.95	.93	.97
A-5	3	.60	.70	.72	.79	.53	.75	.86	.83	.90
A-6	3	.60	.68	.81	.85	.70	.82	.90	.91	.95
A-7	1	.77	.85	.78	.86	.14	.79	.88	.80	.88
A-8	1	.32	.32	.64	.64	.94	.96	.96	.98	.98
A-8a	2	.64	.66	.80	.81	.63	.86	.88	.92	.93
B-1	1	.72	.86	.72	.86	.43	.78	.92	.78	.92
B-2	1	.63	.63	.68	.68	.50	.81	.81	.84	.84
B-3	2	.52	.52	.72	.72	.54	.78	.78	.87	.87
B-4	3	.45	.56	.77	.81	.64	.73	.84	.89	.93
B-5	1	.81	.81	.82	.82	.22	.85	.85	.86	.86
B-6	3	.66	.69	.81	.82	.88	.83	.85	.90	.91
B-7	3	.45	.62	.80	.86	.48	.64	.80	.87	.93
C-1	1	.76	.76	.76	.76	.25	.82	.82	.82	.82
C-2	1	.65	.65	.82	.82	.67	.88	.88	.94	.94
C-3	1	.79	.79	.82	.82	1.00	1.00	1.00	1.00	1.00
Median		63.3	70.0	78.0	81.9	59.0	81.8	86.8	86.8	93.3

As some of the values in Columns A and B leave something to be desired an analysis of the nature of the inconsistencies was performed. It was reasoned that those errors wherein one coder had judged that a codable response existed, while the other had not coded it, would be the least damaging to the study. The net effect of such errors should be to have some undistributed (but borderline) responses appearing in the "No response" category and some borderline responses distributed. On the average it might be expected that such errors would tend to cancel each other. Column E shows the percentage of the disagreements attributable to the failure of one coder to code a response coded by the other.

If this type of error is excluded from numerator and denominator in computing Columns A and B, the results shown in Columns F and G, respectively, present the consistency of coding for those responses coded by both coders. If Columns C and D are similarly treated, Columns H and I result. It is suggested that Columns F and G represent the best estimates of the consistency of the coding procedure.

6. Caveats and Limitations. Several of the limitations of the analyses and of the study should be pointed out before the results and discussions are presented.

a. Non-response. A number of schools and teachers did not respond. While it is felt that the percentage of response was very good, the nature of the phenomenon being investigated (non-application) is such that those who did not respond are likely to be members of the group of greatest interest. However, such considerations do not effect the interview material (where response was virtually complete), and the high percentage of return on the remainder of the study suggests that at least some of the extremes of the non-applicant population were sampled.

b. Method of Analysis. The method of analysis was chosen to provide the most data for the dollar expended. The fact that each of the thousands of bits of information collected was not discussed does not detract from the possibility of subsequent use of these data. In order to focus the presentation the analyses are directed to the question of application and non-application. The breakdowns introduced (criterion group, school type, target groups and sex) were intended to partial out major sources of obscuring variance, leaving the results clear and relatively free of interaction variance. Obviously this effort could never be entirely successful, and the possibility of interaction variance must be kept in mind in considering the interrelationship of any two or more variables with application. However, the considerable group differences observed indicate the relative success of this approach.

c. Sample Sizes. Although the overall sample size is large, some of the subdivisions of the sample have very small Ns. Care has been taken not to over interpret differences based on small Ns, and such care should be exercised in the future. The alternate procedure of combining subdivisions to increase the Ns has been used sparingly due to the obviously different character of some of the subgroups.

d. Statistical Significances. Statistical significance has only been approximated in these analyses due to the fact that the Ns for each combination of variables differ and also to the markedly skewed distributions that are commonplace in these data. This makes the caution above even more important. However, there is an influence in the other direction--that of "restriction of range". The subsorting which has been done to prevent obscuring differing results has also resulted in curtailing the range sharply on some of the variables studied. This factor reduces the size of the relationships observed, sometimes a good deal. Thus small correlations often represent stronger relationships than they otherwise would.

e. Cause and Effect. It is always necessary to mention that the relationship discovered between two variables does not necessarily mean that one caused the other.

f. The Target Group. It was the intention of the analysis to focus primarily on the Target Group as being the group from which new applicants might most easily and reasonably be recruited. The non-applicants in this group represent a group which do not have the obvious excuses of age or non-identification for their non-applicant status. For these reasons it was felt that study of this group represented the most informative and most practical focus for the study.

g. Evaluation. It is felt that these procedures represented the best available approaches to the problems of the study. In general it is felt that the data provided are accurate and useful. Further analysis, beyond the scope of the present contract, is of course possible. Such analyses would probably result primarily in refinement of the present findings rather than new or contradictory ones, though new questions might be explored as well.

III. School Analyses

Introduction

The schools in the study were categorized into Applicant or Non-applicant Groups judgmentally. It soon became evident that there was a rather sizeable group that could not be forced into either Applicant or Non-applicant Groups without "watering down" these two groups to the point of indistinguishability. Therefore these were kept separate and distributed as "Others".

The criterion for inclusion in Application or Non-application Groups was a variable one depending upon the size of the school. It was felt to be unsatisfactory to set a percentage requirement as to the percentage of non-applicant teachers necessary before the school should be termed a Non-applicant school. Such a procedure would not have been effective with either small schools or large schools. A further consideration was that the categorization had to be done in such a way as to allow sufficient schools in each of the Groups to be analyzed. No effort was made to distinguish between schools in the interview subsample and schools in the non-interview subsample, as this was not felt to be of importance with respect to this question. The criterion was a little more liberal with respect to Applicant schools in the small groups than with respect to Non-applicant schools.

If there were three teachers, all three of whom had responded, two of whom were applicants and one of whom was non-applicant, the school was considered an Applicant school; while on the other hand, if one were an applicant and two were non-applicants, the school was considered in the "Other" Group. Schools with one or two teachers were categorically placed in the "Other" Group, and schools with several teachers (more than three teachers), but with only three teachers responding tended to be placed more in the Non-applicant Group under the theory that those teachers who had not responded were more likely to be non-applicant than applicant teachers. It should be pointed out, however, that there first had to be a clear predominance of non-applicant teachers among those who did respond before this latter leniency in assignment was allowed. For example, in a school having seven teachers, wherein two reported and both were non-applicants, the school was considered a Non-applicant school. On the other hand, in a school having twelve teachers, only one of whom reported, this one being a non-applicant, the school was considered in the "Other" category. The principle of assuming that non-respondents would probably tend to be more non-applicants than applicants was also applied in terms of the larger schools, though again it was necessary for there to be more non-applicants for the school to be considered in the Non-applicant category. For example, in a school with 14 teachers and six reporting, four non-applicants and two applicants was sufficient to place the school in the Non-applicant category. In larger schools predominantly Applicant schools were rare, and if the number of applicants outweighed the number of non-applicants at all, a reasonable number reporting, it was assumed that this was an Applicant school. Operationally, the division seems to have worked reasonably well since there are clear differences in percentages, and in reasonable directions, between the Applicant and Non-applicant schools on various of the questions in the analysis.

While little is said about the Other Group in the analysis, it should be noted that the Other Group tends quite often to be itself somewhat distinct or different in percentage responses from either the Applicant or the Non-applicant Group. In addition, in many cases the Other Group is large, if not the largest group of the three, and thus offers perhaps some possibility for future analysis. In the analyses presented below, the focus is on relationships with application. Means, etc., on the several variables can be obtained from the Appendices.

A. Background of the Respondent (Principal)

1. Public Senior Highs. There is little difference in primary position, with about 82% being principals, and some 13% or so being superintendents. There is apparently no relationship between application and age, years of experience, or number of hours of Math/Science training of the principals. There is a small tendency for the Applicant Group principals to have a few more doctor's degrees, but virtually all of the respondents in both Applicant and Non-applicant Groups held an M.A. or higher.

2. Non-Public Schools. The results for non-public schools in this area parallel the public school results very nicely. There is some difference between the Applicant and Non-applicant schools in degrees held by the principal, with all of the Applicant but only 87% of the Non-applicant school principals holding a Master's degree or better. Again, there is more of the Applicant Group holding a Doctor's degree. It is with respect to training of the principal in the areas of Math and Science that the sharpest relationship occurs, a correlation of .37 between application and total number of hours of Math and Science training.

3. Junior High Schools. The situation in this area for junior highs is essentially the same as that for the public senior highs in virtually all respects. There is some slight tendency for the Applicant Group to have a greater number of M.A.'s and correspondingly fewer Professional Diploma level persons than is true of the Non-applicant Group.

4. Summary. In summarizing the findings in this area, it would appear that for all three types of schools none of the variables having to do with the principal's background is strongly related to being an Applicant or Non-applicant school. A possible exception for the non-public schools is the relationship between training in Math and Science and application for the principal. There is perhaps some slight tendency for the applicants to have a little more in the way of higher degrees.

B. School Background

1. Public Senior Highs. In these schools there is a tendency for the Non-applicant schools to have a larger percentage of kindergarten to grade 12

structures (36% vs. 22%) and a somewhat smaller percentage of 9-12 and 10-12 schools than the Applicant schools. There are significant relationships between being an Applicant school and having larger enrollment, more books, more teachers, and, perhaps strangely, larger class sizes.

2. Non-public Schools. Again, there is a distinct difference in the grade structures, with Non-applicant schools having more K-12 and 7-12 grade schools (39% vs. 19%, 16% vs. 6%). On the other hand, Applicant schools have a great deal more 9-12 schools (69% vs. 38%), while neither group has 10-12 schools. There is little difference between Applicant and Non-applicant schools with respect to number of books in the library and average class size for these schools, but again we find that the Applicant schools tend to be larger and to have more teachers (correlations of .46 and .36 respectively).

3. Junior High Schools. In looking at the grade structure for junior high schools, we find a group that falls into the Other category of grade structure. Examination of some of the original questionnaires suggests that most, if not all of these, are legitimate classifications including grade structures such as the following: 8 and 9, 6-9, 6-8, 1-7, 1-10, and the like. It can also be seen that there are a few misclassifications in the Non-applicant Group. These appear on examination to be composed of instances in which the wrong school returned the questionnaire. For example, in one case the questionnaire was sent to the junior high school, and was returned by the senior high school. However, it is quite possible that the junior and senior high schools had been merged into a single school, with the result that there was at the time only one principal.

Just under three-quarters of both Applicant and Non-applicant schools are in the 7-9 category. Further, no difference is observable in enrollment, number of books in the library or number of teachers. However, with respect to average class size there is a tendency for the Non-applicant schools to have larger class sizes (r = .26). This latter is a reversal of the trend in the public senior highs.

4. Summary. In general we see that the Non-applicant schools tend toward the full grade range schools while the Applicant schools tend toward the 9-12 type of schools. For public schools, the Applicant school tends to be larger both in enrollment and number of teachers, and has more books in its library. Class size seems to be positively related to application in public schools, not at all in non-public schools, and negatively related to application for junior high schools.

C. School Program

1. Public Senior Highs. With respect to course offerings in Mathematics, there appears to be little difference between the Applicant and Non-applicant schools with respect to the percentage offering Elementary Algebra and Intermediate Algebra. However, Applicant schools tend to offer Plane Geometry and Trigonometry more often, and also Advanced Algebra. In Science a somewhat larger proportion of the Non-applicants tend to offer General

Sciences, probably instead of some of the more advanced Science courses. In other Science courses there is a tendency for the Applicant Group to be somewhat stronger both in the percentage offering the course and the percentage offering the course as a lab course. In general, the Applicant Group has tried experimental programs in Science and Math considerably more often (75% of the Non-applicants say "none" as compared to 46% of the Applicants), and about twice as many Applicant schools have used homogeneous grouping in Math and Science as Non-applicants. With respect to the rest of the aspects of school programs such as having curriculum supervisors, advanced placement, extra-curriculars, early graduation and promotion, standardized tests, and guidance facilities, there appears to be little relationship between application and non-application and these variables.

2. Non-Public Schools. Findings for the non-public schools in this area are very similar to those for the public schools, particularly with respect to course offerings and experimental programs. A couple of differences do occur, however. The amount of grouping in the non-public schools runs much less than in the public schools, and there is apparently no relationship between this variable and application. In addition, there is a relationship (r = .35) between application and having Science curriculum supervisors in the school system.

3. Junior High Schools. For the junior highs many of the course offering questions were not appropriate. However, it is worth noting that there is a tendency for more of the Applicant junior highs to offer Algebra and General Science. Again, Applicant schools tend to be characterized by more experimental programs, grouping, and, in this case, some tendency to early graduation.

4. Summary. In general, the Applicant schools of all three types tend to have stronger course offerings in both Science and Math and tend to lean more toward experimental programs in Science and Math. With the exception of the non-public schools they tend also to employ grouping to a greater degree in their Science and Math classes. Non-public schools differ slightly with respect to not having as much grouping and to showing the significant relationship between application and having Science supervisors in the system. Junior highs tend to be very much like senior highs. In general, all of the other aspects of school programs examined do not appear to be significantly related to being an Applicant or Non-applicant school.

D. Students

1. Public Senior Highs. Significant relationships for public high schools are found between Applicant status and both the percentage of students going on to college (r = .32) and the number of students who have received letters of commendation or have been semi-finalists in the National Merit Program over the last couple of years. No significant relationships were noted with variables such as per cent college preparatory curriculum, per cent dropout, and number of Math/Science prizes.

2. Non-Public Schools. In these schools we again find a positive relationship (.33) with number of National Merit commendations and semi-finalists, and here a positive relationship (.32) with number of prizes in Science and Math. There is a borderline tendency for percentage of dropout to be related to Non-applicant schools.

3. Junior High Schools. Most of the questions on which this section is based were not appropriate for junior high schools and they were instructed to skip them. However, there is no significant relationship between number of Math/Science prizes won by students and being an Applicant school.

4. Summary. There seems to be a clear-cut relationship between student performance in terms of National Merit commendation and semi-finalists and being an Applicant school for both public senior and non-public high schools. In the non-public schools prizes are a correlative of application, whereas in the public schools per cent going on to college is related. In general it would appear that high student ability and performance is associated with the Applicant schools, and it seems reasonable that this would hold up for junior high schools if an adequate measure of student performance for the junior high school students were available.

E. Community Background

1. Public Senior Highs. The question regarding attitudes of students and their families toward the values of education produced a generally positive response, with slightly less positive tone for the Non-applicant and Other Groups. Applicant schools tend to have more of an urban and suburban residential area as compared to Non-applicant schools (27% vs. 8%), and are somewhat less in the rural areas. With respect to housing there is some small tendency for Applicant schools to serve a smaller proportion of low cost homes. Fathers in the Applicant schools tend to be professionals or clericals, and not farm workers. Type of occupation is much more important than money earned, as there is no relationship with percentage making more than $8,000 or percentage making less than $4,000 per year. While starting salaries tend to be more in the Applicant schools, there is no relationship between application and per-pupil expenditure or percentage of local support. Likewise, per cent of parents belonging to PTA has no significant relationship.

2. Non-Public Schools. With respect to the values of an education, the results suggest that, contrary to the public senior highs, the educational climate in which the non-public school teachers have to work is somewhat more favorable for the Non-applicant Group than for the Applicant Group. The Applicant schools tend to serve an urban residential, or more scattered type of area, while the Non-applicant schools tend more toward the suburban residential and rural types of areas. There is for this group relatively little difference among Applicant and Non-applicant schools with respect to housing. No significant relationships show up for Applicant schools versus Non-applicant schools with any of the other variables, such as father's education, race, teacher's starting salary, per-pupil expenditure, and so forth. An exception is the presence of a public library which seems to be related (r = .375) to

Applicant schools. Percentage of local support for the school system and percentage of fathers who are professionals are two variables which approach a significant relationship with application.

3. Junior High Schools. None of the variables of father's education, father's occupation, race, PTA, income, per-pupil expenditure, starting salary, etc., seems to be significantly related to application. There is apparently little or no difference between Applicant and Non-applicant schools in respect to the climate of attitude toward education in which the teachers have to work. Applicant schools tend to serve more the urban residential, small town and city areas, while Non-applicant schools show up more markedly in urban industrial and suburban residential areas. And, again, Non-applicant schools are found more serving the low cost and slum areas of housing.

4. Summary. Relationships in this area are somewhat conflicting and confusing. However, it seems clear that in general the Applicant schools tend to serve a more urban area with better housing, and thus more favored areas. Non-applicant schools on the other hand tend to be in more rural or suburban areas, and to serve more low cost housing. Little relationship with variables such as father's education, per-pupil expenditure, per cent parents in the PTA, mother's income, are found. However, in the public schools there are clear relationships between father's occupation (application being related more to professional and clerical occupations), and the presence of a public library seems to be an important indicator for both public and non-public schools.

F. Teacher Salary Factors

1. Public Senior Highs. Starting salary appears to be positively related to application for this group of teachers. In response to a question regarding the comparability of their salaries to those of neighboring communities, it became clear that the Non-applicant Group feels itself better off salary-wise than does the Applicant Group. A significantly smaller percentage of them said that their salaries were lower than those in comparable communities and a significantly higher percentage said that their salaries were as good or better. In addition, it is of interest to examine the responses to the question of the influence of various activities on salary increases. Table III-1 shows the results.

It seems clear from examining this table that the most powerful influences are obtaining an advanced degree and obtaining additional college credit. Attendance at NSF Teacher Training Programs is marked by having the second largest percentage in both groups saying "almost never" an influence on salary increase. The rank order of the five factors in terms of importance in getting a salary increase is identical for the Applicant and Non-applicant Groups. Obtaining an advanced degree stands out strongly followed by getting additional college credits, whether or not for a degree, followed quite far behind by in-service training, by NSF Teacher Training Programs and finally by summer travel.

Table III-1

Factors Effecting Salary Increases
Public Highs Combined

Factor	Percentage of Each Group Marking:*							
	Almost Never		Sometimes		Usually		Almost Always	
	A	NA	A	NA	A	NA	A	NA
Additional College Credits	18	16	13	18	10	22	49	31
Obtaining Advanced Degree	4	0	7	10	11	28	73	58
Obtaining Inservice Training	27	39	23	17	11	12	12	10
Attending NSF Teacher Training Programs	31	43	20	23	10	9	8	3
Traveling during the Summer	52	48	10	21	4	10	4	1

* Raw totals for each group (NA & A) differ from 100% due to omits

2. Non-Public Schools. For non-public schools there appears to be little difference between Applicant and Non-applicant schools with respect to starting salary. However, in this group the Applicants tend to consider themselves a little better off salary-wise as compared to comparable communities than the Non-applicants do, though in general neither group seems to consider itself as well off as the corresponding group in the public high schools. Table III-2 shows the effect of various activities on salary increases.

It can easily be seen that the important factors in obtaining salary increases are, as before, getting an advanced degree, additional college credits, and to some extent this time, inservice training. NSF Programs run a poor fourth. It should of course be noted that the non-public schools were characterized by heavy omissions on this question. These omissions arose both from parochial, where one might expect omissions due to the nature of the teaching staff and the salary structure, but also from the private schools in heavy numbers. It is interesting to look at the comparison of Applicants vs. Non-applicants with respect to the percentage of omissions. It is found for additional college credits that the Applicants run 33% omissions, the Non-applicants run 67%. Figures for the other items are comparable. It would appear that from the distribution of omits that the Non-applicant schools prefer to a greater degree than the Applicant schools to fail to answer this question regarding the importance of various salary factors. Interpretation of this is not clear, but tends to suggest that salary factors in such schools do not lend themselves to the asking of explicit questions.

3. Junior High Schools. With respect to salary comparability, Applicants and Non-applicants tended to see themselves as at least equal to their surrounding communities with respect to salary. There was some tendency for the Applicant Group to see themselves as more comparable, and the Non-applicant Group to see themselves as a little bit more on the topside, though this is counterbalanced by a larger percentage of the Non-applicants who saw themselves as below (73% Applicant and 58% Non-applicant see themselves as comparable). Again we find no difference in starting salary for the two groups.

Table III-3 summarizes factors effecting salary increases for the junior highs. As was the case before, it is clear that getting additional college credits, and particularly obtaining an advanced degree are of special importance in getting salary increases. Fewer Applicants than Non-applicants disclaim the importance of inservice training and getting an advanced degree tends to be relatively more important for the Non-applicants than the Applicants. On the other hand, a clearly larger percentage of the Non-applicants (46% vs. 13%) say that attendance at NSF almost never helps in salary increases. This describes the most clear-cut difference in the entire table.

4. Summary. In general, a larger proportion of the Non-applicants in the public senior and junior high schools tend to feel that their salaries are better than comparable communities. There is also a group of Non-applicants in the junior high schools who tend to feel that they are worse off than comparable communities. On the other hand, in the non-public schools the Applicants tend to feel that they are better off. These differences probably are reflections of actual fact in the case of the difference between non-public and public

Table III-2

Factors Effecting Salary Increases
Non-Public Schools

Factor	Percentage of Each Group Marking:*							
	Almost Never		Sometimes		Usually		Almost Always	
	A	NA	A	NA	A	NA	A	NA
Additional College Credits	23	13	16	5	14	10	14	5
Obtaining Advanced Degree	16	7	22	5	8	10	30	11
Obtaining Inservice Training	21	18	14	5	16	10	8	0
Attending NSF Teacher Training Programs	21	28	30	0	0	7	4	0
Traveling during the Summer	37	34	14	0	0	5	0	0

* Raw totals for each group (NA & A) differ from 100% due to omits

Table III-3

Factors Effecting Salary Increases
Junior Highs

Factor	Percentage of Each Group Marking:*							
	Almost Never		Sometimes		Usually		Almost Always	
	A	NA	A	NA	A	NA	A	NA
Additional College Credits	7	16	7	9	13	9	53	53
Obtaining Advanced Degree	0	2	13	5	13	9	67	79
Obtaining Inservice Training	20	35	13	19	20	5	7	21
Attending NSF Teacher Training Programs	13	46	27	14	13	2	13	12
Traveling during the Summer	33	37	13	26	7	5	13	5

* Raw totals for each group (NA & A) differ from 100% due to omits

schools since it is probably the better paying schools who send their teachers to Institutes in the non-public schools. The satisfaction of the Non-applicant schools with their salary levels in the public senior and junior high schools is probably evidence of some complacency in these groups.

With respect to factors influencing salary increases, the prime fact that stands out is that attendance at NSF Institutes is not seen as a very effective means of obtaining a salary increase. It is far outweighed by getting additional college credits and by getting advanced degrees. There are relatively few differences between Applicant and Non-applicant Groups that can be easily summarized on these points, but for public schools the Applicants appear to favor advanced degrees and additional credit as methods of getting salary increases as much or more than the Non-applicants. In addition, Non-applicants also feel more strongly that NSF attendance never helps in getting a salary increment. Thus, it would seem that Applicants would tend to attend Institutes often as a device toward getting advanced degrees and advanced credit, whereas the Non-applicant schools consistently feel that attending Institutes almost never helps. Since many non-applicant teachers are not degree candidates and not particularly interested in advanced degrees, they simply do not attend. In general, awarding degree credit for attendance at NSF Programs would seem to enhance the attractiveness of these Programs from a salary increment standpoint, particularly for the type of education-oriented teacher who now applies. However, such procedures would probably still not attract the non-competitive, non-degree-minded persons who are currently non-applicants, and might even reduce the interest of this group. This is even more likely in view of the relatively large group of non-applicants who seem satisfied salary-wise. The high percentage of omits on this question in the non-public schools reflects the differences in salary structure for the non-public as compared to the public, however the fact that the Non-applicants omit at a rate of almost 2 to 1 suggests that salary policies in these Non-applicant schools may be somewhat secretive, or perhaps not well formulated.

G. Receipt and Treatment of NSF Brochures and Material

1. Public Senior Highs. About 94-96% of all schools report receiving NSF brochures and literature in 1961. The picture is very similar in 1960, with the percentages a couple of points less. However, in 1959, 77% of the Applicant schools as compared to only 56% of the Non-applicant schools, and 62% of the Others received NSF literature.

Table III-4 shows the sources of information about NSF Programs for these schools, and their methods of handling NSF literature. While each of the sources listed was rated as a source of at least some importance, local Institute notices were by far the most important major source for both Applicant and Non-applicant schools, more so for Applicant schools. Direct inquiry appears to be of next importance for both groups. Magazines, newspapers and the State Department of Education appear to be of more importance for Non-applicants than Applicants.

Table III-4

Sources of Information
All Public Senior High Schools
(Percentages of Each Group)

Source	Applicants		Non-Applicants	
	Some	Major	Some	Major
Direct Inquiry	46	18	35	24
Local Institute Notices	8	87	26	64
Professional Magazines	53	10	60	13
Person in Local School System	48	13	50	8
State Department of Education	46	14	64	9
Educators Outside Local System	32	1	34	2
Newspapers and Popular Magazines	29	0	43	1

Methods of Handling NSF Materials
All Public Senior Highs

Method	Percentage Saying "Yes"	
	A	NA
Posted	60	64
Routed (mail) Teachers	71	60
Routed (mail) Departments	30	20
Delivered to Individual Teachers	59	68
Delivered to Department Head	21	21
Announced at Meetings	35	40
Filed	35	31

There are only small differences between Applicants and Non-applicants in their treatment of NSF literature. Somewhat more of the Applicants route literature by mail to individual teachers or department heads while somewhat more of the Non-applicants deliver the literature to the individual teacher. The difference between delivery and routing may be simply a function of the smaller size of Non-applicant schools. Half or more of each group route or deliver literature to teachers or post it.

It had been hypothesized that principals' recommendations would be related to application, but there was little difference between Applicants and Non-applicants with respect to strong recommendation, and also little difference with respect to suggestion. Slightly more of the Non-applicant schools did fail to discuss the matter (8%) with their teachers.

2. Non-Public Schools. In contrast to the public schools, there have been communication failures in the distribution of NSF literature. Twenty-eight per cent of Non-applicant schools as compared to only 6% of Applicant schools failed to receive any NSF brochures in 1961. The corresponding figures for 1960 and 1959 are: 43% vs. 6% and 61% vs. 27%, respectively.

Table III-5 shows the sources of information for non-public schools and the way materials have been handled. Direct inquiry is more often mentioned as a major source by Applicant than Non-applicant schools. It was mentioned more often as a major source (though less frequently as "some" source) for the Applicant schools here than for the Applicant schools in the public school group. Local Institute notices are of much less importance (probably because not received). Professional magazines form a somewhat more important source for Applicants than Non-applicants. Sources marked as of some or major importance by at least 50% of each group were the same in each group: local Institute notices, professional magazines, and persons in the local school system. The relative dependence of the Non-applicant Group on such remote sources as State Departments of Education, educators outside the local system, and popular media as compared to the Applicant Group is clear. The relatively low figures in this table reflect to some extent the comparatively high percentage of Non-applicant schools who presumably have not received information about NSF Institutes.

With respect to the various possible methods of handling NSF materials once received, it can be seen that the most popular methods of delivery for the Applicant schools are routing by mail to teachers or delivering to individual teachers (55-56%) which methods are not so commonly employed with the Non-applicant schools (20 and 43 per cent, respectively). All of these figures are somewhat less than the corresponding figures for public senior high schools.

With respect to the recommendation of the principal about attendance at NSF, 61% of Applicant schools reported strong recommendation as compared to only 31% of Non-applicants. While none of the Applicant schools reported recommending non-application, 7% of the Non-applicant schools recommended not applying.

Table III-5

Sources of Information
Non-Public Schools Combined
(Percentages of Each Group)

Source	Applicants		Non-Applicants	
	Some	Major	Some	Major
Direct Inquiry	12	35	13	20
Local Institute Notices	51	35	30	31
Professional Magazines	47	32	36	31
Persons in Local School System	32	18	25	18
State Department of Education	30	0	13	25
Educators Outside Local System	26	0	31	13
Newspapers and Popular Magazines	14	0	25	7

Methods of Handling NSF Materials
Non-Public Highs Combined

Method	Percentage Saying "Yes"	
	A	NA
Posted	33	7
Routed (mail) teachers	56	20
Routed (mail) departments	16	10
Delivered to individual teachers	55	43
Delivered to department head	24	10
Announced at meetings	16	5
Filed	32	18

3. Junior High Schools. In 1961, 100% of the Applicant schools as compared to 84% of the Non-applicant schools received NSF literature. The corresponding figures for 1960 and 1959 are 93% vs. 77%, and 80% vs. 51%, respectively. These figures suggest that the communication lines between NSF and the junior high schools have been improving over the past few years, but that lack of information still accounts for some of the non-application in this group of schools. Table III-6 shows the sources and the treatment of information about NSF Programs by these schools.

In looking at sources of information for the junior high schools, the most important major source for both Applicants and Non-applicants is far and away notices from the local Institutes. However, 87% of the Applicant Group marked this as compared to only 56% of the Non-applicant Group. The second most important major source is direct inquiry, and again Applicants marked this as a major source much more frequently than Non-applicants (40% vs. 23%).

Professional magazines do not represent nearly as important a major source in the junior high schools as they did in non-public schools. Persons in local school systems and state departments of education constitute a major source for 27% each of the Applicant Group, while only for 19% and 7% each of the Non-applicant Group.

The table suggests that there is relatively little difference between the Applicant and Non-applicant Groups with respect to treatment of materials. A somewhat larger percentage of the Non-applicants appear to have posted, filed, and announced the materials, but virtually the same percentages of each have either routed or delivered the materials to individual teachers (about half) and a little over a quarter have routed them to the department. While 47% of Applicants report delivering the materials to the department head as compared to 16% of Non-applicants, it should be pointed out that this is probably due partially to a difference in size of these two schools and to the fact that the Non-applicant schools probably have significantly fewer department heads to whom materials might be delivered.

A significant correlation between the principal's recommendation for application and being an Applicant school was seen for the junior high schools (.344). About 80% of the Applicant schools strongly recommended applications, but only 30% of the Non-applicant schools.

4. Summary. While distribution of NSF literature has improved over the past three years, it is significantly better for Applicant schools than Non-applicant, and for public schools than non-public. Probably much failure to apply in the past, particularly for non-public school teachers, can be attributed to this factor. In general, all listed sources were marked as of some importance. For public senior highs local Institute notices were by far the most important, followed by direct inquiry. In non-public schools these are reversed (possibly because non-public schools don't get these notices as often). Differences between the Applicant and Non-applicant schools are not dramatic, but Non-applicants tend to list the less direct sources more often. Also, Applicants tend to rely more on professional magazines, and Non-applicants on popular media, but professional magazines are

Table III-6

Sources of Information
Junior Highs
(Percentages of Each Group)

Source	Applicants Some	Applicants Major	Non-Applicants Some	Non-Applicants Major
Direct Inquiry	33	40	28	23
Local Institute Notices	13	87	28	56
Professional Magazines	67	7	49	14
Persons in Local School Systems	53	27	33	19
State Department of Education	53	27	47	7
Educators Outside Local System	33	0	23	5
Newspapers and Popular Magazines	40	0	26	0

Methods of Handling NSF Materials
Junior Highs

Method	Percentage Saying "Yes" A	Percentage Saying "Yes" NA
Posted	60	72
Routed (mail) Teachers	47	51
Routed (mail) Departments	27	28
Delivered to Individual Teachers	53	51
Delivered to Department Head	47	16
Announced at Meetings	27	42
Filed	27	35

mentioned less often by junior highs (indicating perhaps a lower degree of professionalism). Principal's recommendations appear to be importantly associated with application, particularly for non-public schools.

The most common methods of handling NSF literature are routing and delivering it to individual teachers and posting it (generally marked by half or more of the groups). In general it appears that Non-applicant schools treat NSF materials relatively less positively, particularly in the non-public schools, but the differences do not appear large or especially important. Lower figures for non-public schools are to some degree a function of not having received the literature.

H. Attitudes of the Principal toward NSF Programs

1. Public Senior Highs. With respect to the question,"Do you feel that Mathematics and Science teachers in your school would benefit or have benefited from attendance at NSF Teacher Training Programs?", 10.5% of the Non-applicants said "no" as compared to none of the Applicants. About a third of both groups mentioned up-dating and broadened backgrounds. Though the percentages were small, Applicants reported greater enthusiasm, etc., and professional advancement. The modal answer (40.5% for the Applicants, and 36% for the Non-applicants) was "yes" with gross generalizations.

With respect to the question, "How might NSF modify its Programs to better serve the needs of your Science and Mathematics teachers?", the modal change suggested (by 8-11% of both groups) was that more practical material and more practical methods should be included. However, 9% and 16.5% of these two groups respectively reported that no change was necessary. Other responses mentioned by Non-applicants and not by Applicants at all included, "Remove the experience requirement" (6.2%), and other responses to the end of giving more teachers a chance to attend. Some of the Applicant schools mentioned that better communications, public relations, and more direct contact and accuracy in announcements would be desirable, while the Non-applicant schools (7%) indicated that summer or Saturday Programs locally would be desirable.

In response to the question what the main reasons might be that Math and Science teachers did not apply for NSF Teacher Training Programs, about 23.5% of the Non-applicant schools indicated family responsibilities, do not want to leave home, etc., as compared to 18.6% of the Applicant schools. Twelve and a half per cent of the Non-applicants suggested other time commitments as compared to 6% of the Applicant schools. Other reasons mentioned included not eligible and inappropriate location, summer job as a financial necessity, and also near retirement, too old, etc.

2. Non-Public Schools. On the benefits of attendance question, more than half of the Applicant schools as compared to a third of the Non-applicant schools indicated that their teachers had been up-dated, had their knowledge broadened, and had gained better background. Increased enthusiasm, interest, and confidence was also mentioned by Applicant schools. About 7% of the Non-applicants said "no benefit", as compared to none of the Applicants. Almost 28% of the Non-applicant group omitted the question, as compared to none of the Applicant group.

With respect to the question about possible changes, the Non-applicant Group focused on giving all teachers a chance to attend, allowing principals to recommend teachers and select teachers on the basis of need, on better communication and accuracy in announcements, and so forth. Simplification of application procedure (7.5%), more convenient location, and other location problems were also mentioned (5-8%). Applicant suggestions concentrated on removing age limitations, removing experience as a requirement, and on location and scheduling (8% each). Over-all Program changes such as more sequential and degree Programs and general expansion of Programs with workshops drew 8-14% of the responses as compared to none for the Non-applicants. Only 6% of Applicants and none of the Non-applicants said that no change was necessary.

Much of the emphasis with regard to why teachers might not apply was centered on the responsibilities and obligations function. Sixteen per cent of Applicant teachers and 11% of Non-applicant schools mentioned other responsibilities and obligations in general, while 7% of Non-applicants and none of the Applicants mentioned requirements for taking other courses. About 16% of the Applicant Group (compared to none of the Non-applicants) mentioned lack of initiative in applying, complacency or enough education as reasons for not applying, while about 11% of the Non-applicant Group (compared to none of the Applicants) mentioned red tape involved in application as a possible deterrent.

3. Junior High Schools. About two-fifths of the Applicants mentioned up-dating and broadened backgrounds as compared to half as many of the Non-applicants. Sixteen per cent of Non-applicants as compared to 7% of Applicants mentioned greater enthusiasm, interest, confidence, etc. On the other hand, 20% of Applicants as compared to 7% of Non-applicants mentioned improved teaching methods, qualities, techniques, etc.

With respect to possible changes, 46% of the Non-applicants omitted the question as compared to 15% of the Applicants. Twenty per cent of Applicants said no change was necessary as compared to 2.3% of the Non-applicants. Non-applicant suggestions included more practical material and methods with direct applicability to the classroom (7%), but 13% of Applicants also desired this change. Thirteen per cent of Applicants and 9% of Non-applicants wanted to have courses for teachers of general courses and lower level courses for those who wish to brush up. And 14% of Non-applicants as opposed to no Applicants mentioned some problems in scheduling and location.

About 21% of each Group agreed that family responsibilities were a major reason for not applying. About 18% of the Non-applicant Group as compared to 7% of the Applicant Group mentioned other time commitments, duties, summer jobs, etc. Both groups found other aspects of responsibilities and obligations important (15 or 16%). The Non-applicant Group cited being too old, near retirement, or too young in 11% of the cases as compared to none for the Applicants. The Applicant Group cited lack of initiative in applying, complacency, 14% compared to 5% for the Non-applicant Group. Both Groups felt that some location problems existed (7-12%) for local Programs, and a number mentioned eligibility (7%). About 9% of the Non-applicants mentioned red tape involved in application as compared to none of the Applicants.

4. Summary. The modal response to the benefits question was a generalized "yes". There were few substantial differences between Applicants and Non-applicants, the most substantial being the tendency of Applicants to mention subject-matter up-dating and broadening in the non-public and junior highs. Increased enthusiasm and interest was seen as a benefit, more often by Applicants in the public and non-public highs. Non-applicants tended more often to say "no benefit" and in non-public schools omitted the question much more often. Improved teaching methods were mentioned, more by the Applicants in the junior highs.

Again little differences emerged between the groups with respect to possible modifications of the Programs, and the percentage response to each of the possible changes was small. The modal response was to omit the question (probably roughly equivalent to "no change" or "I don't know"). The junior high Non-applicants omitted the question much more frequently than the Applicants, but marked "no change" much less frequently. Non-public Applicants desired degree and sequential Programs and Program expansion significantly more often than Non-applicants.

A prominent opinion as to reasons for non-application was family responsibilities. Although there was little Group difference on this point, the Non-applicants clearly exceeded the Applicants in mentioning other time commitments and obligations. For both non-public and junior highs some Applicants felt that non-application was the result of complacency, while Non-applicants attributed it to the red tape of applying or to being near retirement.

I. Relationship of School Variables to Teacher Variables

In order to examine the relationship of teacher characteristics to school characteristics, a matrix was put together (see Appendix F) in which the mean teacher characteristics for each school were treated as school characteristics. These intercorrelation matrices measured the relationship between the ordinary school characteristics and the average characteristics of the teachers in the schools.

1. Public Senior Highs. There is a distinct tendency for Applicant schools to have teachers who have higher average amounts of training in Chemistry, Physics and Math on the undergraduate level. One of the strongest relationships in the study is found between being an Applicant school, and the average total number of graduate hours of the teachers in the school ($r = .46$). On the other hand, there is a tendency for those schools where teachers have higher average Physics grades to be Non-applicants. (This latter finding is somewhat difficult to explain unless it signifies something like that Physics teachers tend to be somewhat more independent and to feel that their training is sufficient.) Where there is a higher average number of Math/Science organizations belonged to by the teachers, the school is likely to be an Applicant school (.29), and some tendency is noted for higher average

number of journals read to be associated with application. With respect to income it is the higher salaried teachers who are associated with the Applicant schools (.28), and there is a slight tendency for those with higher outside income to be associated with Non-applicant schools.

2. Non-Public Schools. The findings are somewhat different for non-public schools. Biology hours approaches a significant relationship with application, but so do certification and decision to remain in secondary teaching. One of the highest relationships in the study is noted between being an Applicant school and average number of Math/Science organizations belonged to by the teachers ($r = .54$). There is also a tendency for the Applicant schools to be schools where a higher number of journals are read.

3. Junior High Schools. Findings for the junior highs just about exactly parallel those for the senior highs. Biology hours and average number of Math/Science organizations belonged to approach a significant relationship with Applicant schools, and average total graduate hours has a high relationship (.42) as does average number of journals read (.42).

4. Summary. In summary, for all schools it can be seen that higher average training in scientific types of subjects tends to be related to being an Applicant school, and average total number of graduate hours is a good predictor for the public schools. Again, professionalism, as indicated by the average number of Math/Science organizations belonged to and the average number of journals read, shows up for all kinds of schools. Salary considerations seem to be related to application only for the public schools, while certification and intention to remain in secondary teaching are related to application only for the non-public schools. It is professional orientation which most sharply distinguishes the Applicant from the Non-applicant schools in the non-public category, while in the public schools it tends to be graduate training which most sharply distinguishes between the two Groups.

J. School Size Observations

1. Public Senior Highs. Because splitting the sample into all possible size groups would have produced very small numbers in each category, it was decided that intersize school comparisons would not be done on a systematic basis. The major reason for sampling by such groups was to insure adequate representation for each of these groups, and this purpose was accomplished. Nevertheless, a few observations were made that seemed to be worth commenting on, even though they may not be stable. These are presented below.

In general, it would seem that as school size grows, the degree of urbanization increases, and along with this trend the Applicant schools tend to come from the more urbanized areas, particularly the residential areas. For all public schools combined, Non-applicant schools are to be found more strongly in the rural farm regions.

With respect to the 1959 distribution of literature, the weakest point and greatest difference between Applicant and Non-applicant schools occurs in the Type 1, or very small schools (83% vs. 42%), and in the Type 2 schools the picture is more equivalent (65% vs. 61%), and improves for the Type 3 schools (89% vs. 70%). There is little relationship with size for 1960 and 1961, however. It would appear that the current literature distribution efforts of the National Science Foundation are quite effective, but also that some of the backlog of non-applicants has occurred through communication failures in 1959 and prior years.

With respect to the use of direct inquiry to NSF as a source of information about the Programs, this source seems to be increasingly important with school size through Types 1, 2, and 3 schools. Notices from individual colleges or universities who are offering NSF Programs tend to be a major source for all types of schools, and increasingly so with increasing size of school. Information derived from somebody in the local school system is considered an increasingly important source with size of school.

With respect to routing NSF literature through interoffice mail to individual teachers, there is a clear trend in Types 1, 2, and 3 schools for a larger percentage of Applicants to use this form of distribution as compared to Non-applicants. With respect to Type 4 schools, the percentages are switched, with 56% of the Applicants and 90% of the Non-applicants using this form of distribution. It is interesting to note that a larger percentage in Type 1 (the small schools) use this form of distribution than in Types 2 or 3 both for Applicant and for Non-applicant groups. This is interesting when one considers the smallness of size of the Type 1 schools should make it possible for the principal to talk about these things on an individual basis. Delivery of such notices directly to individual teachers shows a fairly decreasing trend with increasing size of school, ranging from 71% in the small schools to only about 30% in the large schools. While large schools on the average use this type of delivery less frequently than small schools, but when they do do so they are characterized by being Applicant schools substantially more often than Non-applicant.

As schools get larger there is a distinct trend for the principal to have a higher degree. Only 24% of Type 1 schools had principals with less than a Master's degree, and these figures range through 11%, 5% and down to 3% in the large schools.

With respect to the question on the values and the attitudes of students and their families toward the values of education, it is surprising to find as large a percentage of school situations where there is some mixed feeling toward the values of education, particularly in the small schools, where 58% of the Non-applicants and 33% of the Applicants reported mixed feelings.

K. Summary of School Analyses

There are few relationships between principals' background characteristics and being an Applicant or Non-applicant school. There is some small tendency for non-public school Applicants to be a little stronger in Math and Science training and to have higher degrees. With respect to type of school, Non-applicants tend to be smaller, full-range high schools, with fewer books in their libraries. Applicant schools have stronger course offerings in Science and Math and are more inclined toward experimentation and homogeneous grouping (except in the non-public schools). Applicant schools tend to have better students in terms of numbers of National Merit Scholarship letters of commendation and semi-finalist winners.

The Applicant school tends to serve urban areas with better housing, while the Non-applicant school tends to serve a rural, low-cost housing area. (These are, of course, trends, and not to be thought of as being strictly true.) There is no relationship observable for any of these schools with father's income, percentage of parents going to PTA, or other similar variables. However, the presence of a public library is related to being an Applicant school, and Applicant schools tend to have parents in the professional and clerical as opposed to the farm class.

Non-applicant senior and junior high schools are characterized by principals who feel that their teachers' salaries are better than those in surrounding communities. (The reverse is true for non-public schools.) NSF Programs are not seen as effective methods of getting salary increases, particularly by the non-applicants. It has been seen that the applicant teachers tend to be much interested in self-improvement through education, thus they may attend or apply for NSF Programs as part of their general orientation toward getting advanced degrees and additional college credits. Non-applicants do not apply because they feel it does not help their salary much; they are not so much interested in education and self-improvement; and they tend to be somewhat more satisfied with their salaries.

The distribution of NSF literature tends to be better in the Applicant schools, better in 1961 than in previous years, and better in the public than the non-public schools. In the public schools notices from the local institutes are the prevalent source of information, followed by direct inquiry, while the reverse is true for the non-public schools. The Non-applicant schools tend to list less direct sources of information than these more often than the Applicant schools. Applicants tend to list professional magazines as a source generally more often as compared to Non-applicants who list popular media more often. Professional magazines show up significantly less in junior high schools than in public and non-public senior highs.

Routing and delivery to individual teachers and posting of notices are the most common methods of handling NSF materials. Non-applicant schools and non-public schools appear to treat NSF materials somewhat less definitely than do the Applicant and public schools. Principal's recommendation was seen as a powerful factor, particularly for non-public schools in its association with application.

With respect to the benefits of Institutes, applicant principals tended to see these as subject matter up-dating and broadening somewhat more often, while non-applicant principals mentioned that they saw no benefit more frequently than applicant principals. Applicant principals tended to mention increased enthusiasm and interest on the part of the teachers more often.

With respect to possible changes in the Programs, there were a large number of omits on the part of each of the Groups, which might roughly be equated to "no change", or "I don't know" responses. The non-public Applicants mentioned Program expansion and degree and sequential Programs more frequently.

With respect to principals' estimated reason for non-application, family responsibilities was mentioned quite frequently by all Groups. The Non-applicants mentioned other commitments and obligations more frequently. The Applicants felt much more frequently that Non-applicants would be complacent and satisfied with their own educational level, while the Non-applicant principals mentioned the "red tape" involved in application.

In relating school characteristics to mean teacher characteristics, it was found that Applicant schools tended to have teachers with higher average training in Science; total number of graduate hours was particularly well related to Applicant status in the public senior and junior high schools. In addition, professionalism as indicated by the number of Math/Science organizations belonged to and the number of journals read was well related to being an Applicant school, particularly in the non-public schools.

In examining the relationship of size to application, it was found that in Applicant schools application tends to be related to increasing size of school and to increasing urbanization. Applicants were also characterized by receiving literature more frequently in 1959, and the larger the school, the more frequently they received it. Local Institute notices and use of direct inquiry as sources of information are also used more frequently with increasing size of school. In small schools the Applicants tend more to route their notices to the individual teachers. Delivery to individual teachers decreases as size increases.

It was found that for very small schools there is a more mixed attitude toward the values of education and Science than is true of larger schools.

IV. Teacher Questionnaire Analysis - Target Group

This analysis draws on both the distributional analyses and the correlational analyses for the results presented. It does not attempt to exhaust the possible interrelationships in the data. The results are presented and the analyses organized according to a number of areas of interest. Within each area results for senior highs, non-public, and junior highs are presented. In the questions that were included in distributional analyses, the non-applicant group represents people who have never applied for any Program in the past five years, and the applicant groups represent people who have applied for any one of the Programs during any of the five last years. This restriction leads to a negligible amount of contradictions in the data since the analysis is being confined only to the last three years, 1959, 1960, and 1961. The reason for such restriction was that it was felt that the last three years were most important and that the memory of those reporting gets a little hazy beyond three years.

With respect to the correlational analyses, it must be remembered that the criterion variable, any application, is included as one of the variables in the matrix. Thus, significant differences in means between the applicant and non-applicant groups will be indicated by significant criterion correlations, that is, significant correlations with the dichotomous variable "any application". There is no practical way to report means of the two groups separately. Of course the distributions were run separately for the criterion groups. In the Technical Appendices the means for each of the variables in a correlational matrix, that is, each of the cross-combinations of variables, are presented as matrix of means. Separate matrices of standard deviations,are also presented. The means, standard deviations, weighted N's, and true N's for each of the diagonal entries, that is, each variable with itself, are summarized at the end of each correlation matrix. The correlation analyses automatically combines the AR group with the AA group. Other considerations might suggest that the combination of AR with AA in these correlation analyses is perhaps not the most satisfactory treatment of these two groups. However, it should be remembered that to have treated the entire analysis as a distributional analysis would have eliminated the valuable cross-correlational information which is now available from these matrices, which can later be subjected to factor analysis, which makes possible partial correlations to examine the relationships of two variables with other variables held out, and which in the last analysis will perhaps prove most generally satisfactory.

Another caution in the interpretation of these figures should be inserted. Since a thoroughly substantial proportion of the respondents of this study have not applied to any of the Institutes, all the questions regarding the specific number of applications and acceptances for specific years (questions 28A and 28B and 28C) are based on greatly reduced N's as compared to the N's in the remainder of the analysis. Again, there is a distinct tendency for those who applied for one type of Program not to apply for other types. (It should be noted that the diagonal N's are substantially larger than the off-diagonal N's.) Finally, both for 1959 and for Academic Year Programs the percentage of application is so small that the figures for these values are based on very small N's comparatively speaking.

The analyses are based primarily on the relationships of the variables with the criterion variable. However, other more detailed analyses are possible, based on the off-diagonal means. These off-diagonal means, in effect, represent the means on the other variables for the sub-group of people who applied in specific years. An illustration of the type of additional analyses which can be performed with the data supplied is provided in the Introduction to the Technical Appendices.

One further caution about the correlational analysis: in many cases the true N's are quite large, and correlations which appear to be pretty small and insignificant are statistically significant. Correlations significant at the 5% level are approximately .06, .19, and .10 for senior, non-public, and junior highs respectively. It has been assumed that those correlations which appear to be statistically significant should be mentioned. It should of course be realized that the operational significance may leave a good deal to be desired in some cases, but it is believed that those mentioned represent valid relationships which, though of small practical import, could easily be worth noting as parts of the general picture.

A. Background

1. Senior Highs. There appear to be no significant differences in marital status among the three criterion groups--roughly 80% are married and living with spouse. Men predominate in teaching Math and Science (about 4 to 1) and there is a slight tendency for non-application to be associated with women. No relationship was discovered between application and age, though it must be remembered that the Target Group is restricted in range on the age variable, since the extremes of the distribution (and those which would be expected perhaps to be related to application and non-application) were cut off and placed in the Non-target Group. Thus, the significant relationship found in the Preliminary Analysis between non-application and age has now been eliminated, which tends to verify the hypothesis that non-application would be associated with the extreme age ranges. The average Target Group teacher is 36.9 years old. The Target Group averages about two and one-half children with an average age of youngest child at 5.8 years. There is no discernable relationship between either of these two variables and non-application or application, bearing out the conclusion of the Preliminary Analysis that neither number of dependents nor age of youngest dependent apparently plays any significant part in non-application.

2. Non-public High Schools. Contrary to the senior high schools there is a difference in marital status in the non-public schools. There is a much larger proportion over-all who are single, from 3/5ths in the AR group and NA group to almost 4/5ths in the AA group. It should be pointed out that these results derive largely from the high loading of single people in the parochial schools, and that the percentages just quoted roughly parallel the proportion of parochial teachers in the combined non-public group for each of the three criterion groups. There are about as many men as women teaching Mathematics and Science in the non-public high schools, but sex does not appear to be related to application.

Again age does not appear to be related to application, the mean age of Math and Science teachers in this group being 38.3. Although there is apparently no relationship between number of dependents and application, there is a negative relationship between age of youngest and application for this group. This means that the younger the child, the less likely the person is to apply. Part of the reason for this finding can be seen when it is noted that the age of the youngest child for the total sample in this group is 8.6 years, as compared to the age of youngest child for 1961 Summer applicants in this group which was only 1.6 years. This figure is based upon a severely reduced N, however, and the finding is quite likely to be a chance one.

3. Junior High Schools. With respect to marital status, about 1/5th of the AA group and slightly less of the other two groups are single. This corresponds fairly well to the public high school findings. The average age of teachers is virtually identical with that of the public schools (36.8), and we find that again men predominate in the teaching of Mathematics and Science, about one quarter of the teachers being women. There is a slight tendency for non-application to be associated with being a woman. With respect to the other background variables the junior high schools are virtually identical with the senior high schools.

4. Summary. Of the background variables studied, only sex appears related to application for the public school teachers, women showing a greater tendency to be non-applicants. However, in non-public schools, single persons show less tendency to be non-applicants, and sex is not a factor in application. This may be due in part to the much larger proportion of unmarried women in this group. Age of dependents is probably not related to application.

B. Educational Background

1. Senior Highs. The findings in this area parallel those of the Preliminary Analysis quite well. There is little difference in the distribution of the three groups with respect to type of undergraduate schools attended, with about one-half going to publicly supported institutions, and about 35% attending non-public institutions. There are some differences in undergraduate training. Summing these up, almost three-quarters of the AA group majored in Science or Math or both as compared to only 57% in the NA group, and about two-thirds of the AR group. In addition, some significant relationships between application and number of undergraduate Chemistry hours and application and number of Physics hours were observed for this group. In spite of these differences in majors and training, there were virtually no differences in degrees awarded, with approximately 57% receiving the Bachelor of Science, and approximately 30% receiving the Bachelor of Arts. Table IV-1 summarizes the data on majors.

With respect to graduate education, a distinctly larger proportion of the AA group has received some graduate education (over half as compared to a little over a third for the other two groups). In addition, the best single relationship with application is for total number of graduate hours,

Table IV-1

Graduate and Undergraduate Majors
by Criterion Group
and Type of School *

	Undergraduate		Per Cent Reporting Grad.Work	Graduate**	
	Math-Sci.	Educ.		Math-Sci.	Educ.
Public					
AR	65.5	2.9	35.0	31.7	55.7
NA	57.4	7.1	37.2	28.9	58.4
AA	74.4	9.3	53.2	40.4	48.1
Non-Public					
AR	45.6	17.6	15.2	42.0	58.0
NA	63.4	7.4	31.2	33.7	32.7
AA	69.2	6.1	54.7	51.2	32.5
Junior					
AR	50.6	6.5	39.0	2.6	20.8
NA	45.5	10.4	37.4	5.2	20.6
AA	55.1	11.2	41.7	13.9	22.3

* Percentages are not intended to add to 100%

** Based only on those with some graduate training a correlation of .31. It is interesting to note that the AA group tends to go more to the publicly supported institutions (about two-thirds as compared to roughly one-half for the other two groups). Again, the AA group shows a larger proportion of its members in majors in Science and Math, and a smaller proportion outside Science/Math or education than the other groups. The NA group shows a considerably larger proportion of graduate majors outside the fields of Science, Math, or Education (a little over one-quarter). Of those who get graduate degrees, the AR group tends toward the M.A. degree (a little over half) while the NA and AA groups tend more to the Master of Science degree (about one-quarter each); and the AA and AR groups tend toward the Master of Education degree (about 30%). Examining these figures in the light of figures for the graduate majors it would appear that many Education majors get an M.A. or an M.S. in Education rather than a Master of Education, and that further detail would be necessary in order to resolve the exact type of studies represented by these degrees. Information about grades was collected for undergraduate work and, contrary to the Preliminary findings, no relationships are apparent between grades and applications. Finally, there is a small tendency for Applicants to be currently working on a degree. (A quick look at the figures for 1961 applicants shows that some 29% of the over-all public senior high Target Group was working on a degree as compared to some 35% of '61 Summer Applicants, and 46% of '61 Inservice Applicants.)

2. Non-public Highs. As compared to public schools, a much larger proportion of the non-public school group has attended non-public undergraduate schools (roughly four-fifths). The NA group here is characterized by relatively lower percentage attending non-public schools, and a relatively higher percentage attending state supported teachers colleges (14% vs. none for the other two criterion groups). Comparatively speaking, the AR group attends public colleges and universities about twice as often as the NA and AA groups. With respect to undergraduate majors, the AR group appears to have about three times as many Education Majors (18%). There is relatively little difference in the proportion of the NA and AA groups taking Science degrees in this group (about a little over two-fifths), but these exceed the AR's by about two to one. While about the same proportion (55% to 60%) of each of the three groups received the Bachelor of Arts degree, there is a sharp difference with respect to the Bachelor of Education or the Bachelor of Science in Education degree where 28% of the AR group receives this degree as compared to virtually none of the other two groups. In addition, only 13% of the AR group receives a B.S. degree as compared to 35-40% of the other two groups. Thus it appears that with respect to these undergraduate degrees, etc., there is relatively little difference between the NA and the AA groups, but that the AR group is a much more Education-oriented group as compared to the other two. With respect to specific subjects, amount of undergraduate training in undergraduate Mathematics hours shows some very light tendency to be related to application.

In looking at the graduate school picture, the percentage of the AA group getting a graduate education is much larger than that of the other two groups (well over half as compared to less than a third for the NA and less than a sixth for the AR groups). Most of those who go to graduate school attend non-public colleges (about two-thirds, four-fifths, and 100% for the AA, NA, and AR groups respectively). Of those getting graduate training, about a third of both the NA and AA group major in Education only, as compared to almost three-fifths of the AR group. This finding bears out the emphasis on education noted in the undergraduate training of the AR group. About a third of each of the three groups have graduate majors in Science or Math and Science, but about 15% of the AA group major in Math only as compared to somewhat fewer of the other two groups. Again, total number of graduate hours has one of the highest correlations (.24) with application of any of the other variables.

With respect to graduate degrees, about a third of each of the groups, or a little more, get a Master of Science degree. However, close to three-fifths of the AR and AA groups get a Master of Arts as compared to less than two-fifths of the NA group. Roughly a sixth of the NA and AA groups get a Master of Education as compared to none of the AR group. While this may seem a little strange in view of the emphasis of the AR group on the Education field, it must be remembered that the Master of Arts degree may be a Master of Arts with Education specialties and Master of Science in Education is also a possibility. About 28% of the total group is working on another degree, and there does not appear to be a significant relationship between this and application for this group. In looking at the relationship of grades to application, we find two significant relationships between grades and application for Biology and Education. Thus, it would appear that there is some tendency for the applicant group to be a brighter group.

3. Junior Highs. There is relatively little difference in the undergraduate schools attended by the NA and AA groups, though the AR group shows a slight tendency to attend relatively more private schools than state supported schools. Somewhat under a half of the AR group, and somewhat over half of the NA and AA groups attend public supported schools. Very little difference in the three groups shows up for under-graduate majors, roughly 10% majoring in Education, a little over one-quarter in Science or Math and Science, a little under a quarter in Math, and about two-fifths in other areas. Again, there is little difference in the degrees obtained, with approximately half of each group getting a Bachelor of Science degree, about 14% getting a Bachelor of Education, and around one-third getting a Bachelor of Arts. No relationship between number of hours of training in any of the subjects studied, or grades received in any of the stress subjects studied, and application was observed.

About two-fifths of these three groups get some graduate education. There is a significant relationship between total number of graduate hours and application (correlation of .21). There appears to be some tendency again for the AA group to prefer the public supported institutions. Again, relatively more of the AA group majors in the Science and Math areas, and approximately a fifth of each of the three groups majors in Education. Comparatively, the AR's get more M.A.'s (about 42%), the AA's get more M.Ed.'s (about 39%). Finally, although there appears to be no significant difference in the percentage currently working on a degree, approximately 30% or so of the total sample in this group are.

4. Summary. AA's are characterized by a greater total number of graduate hours, and by a greater percentage of Science and Math majors in both graduate and undergraduate schools. The AA's show relatively greater preference for public colleges and universities for their graduate work. The AR's show a relatively strong preference for Education majors particularly in the non-public group, while the NA's may major outside the areas of Science, Math and Education. Grades are related to application only for the non-public group, and current work on a degree only for the senior highs. The picture with respect to degrees is somewhat confused with more AA's getting graduate Education degrees than AR's inspite of the reverse trend in majors. It is quite clear, however, that the AR group is education-oriented rather than Math/Science-oriented.

C. Work Experience

1. Senior Highs. The average number of years of teaching experience for the total group is approximately nine years, while the average number of years of Math/Science teaching experience for the total group is 8.3 years. There appears to be relatively little, borderline, if any, significant relationship with number of years of teaching experience and application. In spite of the fact that the group teaching Math/Science under 40% time has been removed, producing severe curtailment of range on this variable, there are significant relationships between application and the percentage time spent teaching Chemistry and Physics, and the percentage time spent teaching Math and Science in general. There is a substantial negative relationship between the per cent time spent teaching other subjects and application. These figures confirm the hypothesis strongly set forward in the Preliminary Analysis that direct involvement with the field in terms of teaching assignments would be related to application for these Programs. The over-all average percentage of time spent teaching Math and Science for this senior high school group is just under 80%.

Although there isn't a great deal of difference in the percentages, it seems clear that the NA group is somewhat less certain about remaining in secondary teaching in general, and similarly somewhat less certain about remaining in Mathematics and Science teaching. We see that about four-fifths of the NA group intend to remain in secondary teaching as compared to close to 90% for the other two groups, and about the same percentage of the NA's tend to want to remain in Math and Science teaching as compared to well over 90% for the other two groups. These figures suggest that the AR and AA groups have some ideas about transferring their teaching to some other level than secondary, but that in general they are decidedly more determined to stay in the subject matter areas in which they are teaching--that is, in Mathematics and Science. Again, this finding goes along with the results reported in the Preliminary Analysis, with the exception of the fact that it is now difficult to distinguish the AR and the AA groups in any clear and consistent manner.

With respect to certification, it would appear that the NA group is slightly less well certified than either of the other two groups, showing 81% fully certified and 11% on temporary certificate. Certification deficiencies appear to be about equally spread among Science and Math and Education for these three groups.

With respect to tenure, there is relatively little difference in the percentage of each group reporting that a tenure system is not available in its system (about a third). However, almost half of the AA group has been placed on tenure as compared to between a third and two-fifths for the NA and AR groups. As mentioned in the Preliminary Report, number of hours devoted to outside activities could well be a reason for not applying, due to being busy. If anything, the situation is reversed. The correlation of number of outside hours and application is a borderline significant value, indicating that, if anything, it is the people who have greater outside responsibilities who apply. The sample as a whole averages approximately 14 hours per week in school activities outside of the regularly assigned school hours. The same situation exists with respect to supervision of extracurricular activities, with the NA group reporting a substantially larger percentage (one third) supervising no extracurricular activities, as compared to about a quarter of each of the other two groups. In addition, the AA group reports a larger percentage supervising extracurricular activities in the field of Math and Science than for either of the other two groups.

2. Non-public Schools. Again we find that number of years of teaching experience and number of years of Math/Science teaching experience do not appear to be related, at least strongly, to application. The total non-public high school group has an average of 11.7 years of teaching and 9.2 years of Math/Science teaching.

Similarly, the per cent time teaching various subjects does not come out strongly enough with the reduced N in this group to be significant, though the correlations appear to be in the proper direction. These teachers average over-all 74.4% of their time teaching Math and Science.

While the certification picture for this group is somewhat obscure because of the fact that there is a large percentage of other response to the question, the NA group again appears to be the highest (almost a third) in stating that they have no certificate. Again, the NA group tends to report a larger percentage (14%) of deficiencies in education. About 6-9% of each group indicates deficiencies in Science or Math.

The tenure question does not seem to be appropriate for non-public high schools, as anywhere for five-sixths to almost 100% of the groups report that there is no tenure plan available in their school systems. Findings with respect to intention to remaining in teaching or in Math/Science teaching are just about identical to those in the public senior highs. Again, number of outside class hours put in involves no relationship with application. The over-all non-public sample puts in an average of 16.9 hours outside regular school hours each week. With respect to the supervision of extracurricular activities, about three-fourths of each group have some extracurricular supervision. However, both the AR and the AA groups have more responsibilities in Math and Science than the NA group.

3. Junior Highs. Again, we find that amount of teaching experience either in general or in Math and Science apparently has no relationship to

application. The junior high school sample averages 8.4 years of general teaching experience and 7.5 of Math/Science teaching experience. There are significant relationships between application and the percentage time teaching Chemistry and Physics and between application and the percentage time teaching other subjects, the first a positive relationship, and the second negative. Again these results parallel earlier findings. With respect to intention to remain in secondary teaching and in secondary Math teaching, the AA group stands out, being more determined to remain in both of these areas. About seven-eighths of the AA group intends to remain in secondary teaching as compared to about five-sixths or slightly less of the other two groups. With respect to remaining in Math/Science teaching, it is over 90% of the AA group as compared to about 4/5ths of the other two groups. Interestingly, it is the AR group rather than the NA group that clearly has 8 or 9 per cent who wish they could get out of teaching. Clearly, more of the AA group than the NA group are fully certified, with the AR group somewhat intermediate. Again, about 6-8% of each of the three groups reports certification deficiency in Science or Math.

With respect to tenure, there is virtually no difference among the three groups with respect to the percentage who have been placed on tenure (45-48%). However, when compared to the percentage of the group who have a tenure system available in the schools, it is seen that the AA group has been placed on tenure in a much larger proportion of available cases than the NA group, and the NA group much larger than the AR group. A full third of the AA group reports no tenure system available in its schools as compared to over a fifth of the NA group and 12% of the AR group.

With respect to number of outside hours, we again find no relationship with application, and that the junior high school group averages about 11.3 hours per week outside of regular school hours. With respect to extra-curricular supervision, relatively little separates the three groups, although the NA group tends very slightly to report fewer responsibilities for the supervision of extra-curriculars. The AA group clearly has more responsibility for the supervision of Math and Science extra-curriculars than does the AR group, which exceeds the NA group (34% vs. 29% vs. 22%).

4. Summary. In the public schools per cent time teaching other (non-Math or Science) subjects is related to non-application. Teaching experience is not, however. Applicants tend more to want to remain in Science or Math and secondary teaching, though senior high teachers wish to advance to college levels. In relation to tenure available, AA's have been placed on tenure more often and have certification deficiencies less often. The AA have greater extracurricular supervision in Math and Science areas if not in general. The non-public schools are quite similar in the above respects.

D. Outside Activities

1. Senior Highs. In looking at the 1961 summer activities for the three groups (Table IV-2), public schools are very similar. In senior highs a small percentage teach summer school (10-14%) or travel (6-13%). More than

Table IV-2

1961 Summer Activities

	Taught Summer School	Held Non-School Job	Traveled	Attended Summer School	None of These
Public					
AR	13.6	38.1	6.6	30.0	17.9
NA	13.6	32.7	12.7	25.3	26.5
AA	10.1	18.4	6.0	54.5	17.0
Non-Public					
AR	24.0	21.6	6.4	39.2	21.6
NA	16.9	13.8	5.2	42.8	22.8
AA	15.3	9.7	2.0	62.3	12.6
Junior					
AR	16.9	38.7	16.8	21.8	16.8
NA	9.9	35.1	13.9	20.1	26.9
AA	5.8	18.2	10.9	54.4	15.9

half of the AA's attend summer school (this probably includes Institutes) as compared to 25-30% of the other groups. On the other hand, relatively few (18%) hold non-school jobs as compared to a third or more of the other two groups. The NA group in the public schools shows over a quarter—who don't do any of the summer activities mentioned. Tables IV-3 and IV-4 show similar results for 1959 and 1960 summer activities; except that the NA's tend to fall even more clearly below both groups in attendance at summer school, and AR's tend to surpass the others even more clearly in percentage of non-school jobs. A smaller percentage of the NA and AA groups have held extra jobs during the last several school years than of the AR group (Technical Appendix A). There is relatively little difference between the AA and NA groups. However, those holding extra jobs tend to hold education-related jobs to a greater degree in the AA group than in the AR group. The percentage holding extra jobs at some time during the last several years are: 43%, 52%, and 47% for NA, AR, and AA groups. Table IV-5 presents the results by year for each of the last three years. Thus it would appear that whatever the reason for non-application, particularly to Inservice Institutes, the NA group has no more excuse than the AA group on the subject of spending its time on extra jobs during the school year..

2. Non-public High Schools. The non-public school teachers are similar in summer activities except that a somewhat higher percentage across the board attend summer school (38-62%) and that it is the AR's who tend to hold the non-school jobs (about 22%). In this group the AA's held extra jobs during the school year somewhat less frequently than the other two groups. The percentage of those holding extra jobs at some time during the last several years is much lower in all three groups (37% vs. 26% vs. 14% for the AR, NA, and AA groups). A full five-sixths of the jobs held by the AR group were the non-skilled, non-education type as compared to less than half of the ones held by the NA group, and about three-fifths of those held by the AA group. It will be noted that the findings with respect to outside work, extra jobs, are virtually identical both in order and magnitude with those described in the Preliminary Report.

3. Junior High Schools. The junior high results in this general category are virtually identical to those for the public senior high schools.

4. Summary. In summary, it would appear that the NA group displays — less drive to achieve, at least in terms of outside the regular job activities. The AA group shows not only a strong self-improvement drive, but tends to hold education-related positions more often. The AR group shows drive but is less education-involved, holding extra or summer jobs most frequently but much less often in education-related areas.

E. Institute Application and Attendance

1. Senior High Schools. Table IV-6 shows the results. With respect to applications to various kinds of Institutes, there is no difference among the percentage of the AR and the AA groups applying for Summer Institutes at some time in the past (84%). However, the AA group has applied much more often for Inservice Institutes (39% vs. 12%), and it has applied approximately

Table IV-3

1960 Summer Activities

	Taught Summer School	Held Non-School Job	Traveled	Attended Summer School	None of These
Public					
AR	10.6	37.0	11.8	28.7	18.2
NA	10.3	32.4	10.3	23.1	28.5
AA	7.4	23.3	6.6	48.5	17.7
Non-Public					
AR	8.8	28.6		56.8	15.2
NA	18.3	20.5	3.3	40.5	19.8
AA	14.3	16.2	5.0	54.8	15.1
Junior					
AR	7.6	45.6	11.3	33.6	18.2
NA	7.6	35.8	12.0	23.7	28.6
AA	3.5	25.4	8.2	56.6	14.2

Table IV-4

1959 Summer Activities

	Taught Summer School	Held Non-School Job	Traveled	Attended Summer School	None of These
Public					
AR	10.5	44.3	7.7	26.3	19.6
NA	9.9	35.3	9.6	22.2	26.9
AA	6.6	26.4	5.9	45.6	18.6
Non-Public					
AR	8.8	19.2		56.8	15.2
NA	10.7	23.5	1.1	37.8	31.4
AA	15.5	13.0	3.5	59.1	14.4
Junior					
AR	.2	46.1	8.9	34.5	16.8
NA	5.1	34.0	10.8	26.3	30.3
AA	8.3	27.9	6.4	47.4	18.0

Table IV-5

Percentage Holding Extra Jobs During the Last Three Years by Criterion Group, Year, and Type of School

	AR	NA	AA
1961			
Public	33.2	26.4	24.8
Non-Public	28.0	19.3	9.4
Junior	30.8	25.7	28.1
1960			
Public	35.5	29.5	27.1
Non-Public	24.0	20.4	9.4
Junior	37.8	27.0	29.2
1959			
Public	37.4	26.2	28.8
Non-Public	21.6	15.8	4.7
Junior	30.1	25.2	25.2
All Three			
Public	25.3	21.7	18.1
Non-Public	15.2	9.1	4.7
Junior	23.7	20.2	18.6

Table IV-6

Any Application by Type of Institute

(Percentages of each Group)

	Public		N-Public		Junior	
	AR	AA	AR	AA	AR	AA
Summer	83.9	84.0	84.8	74.7	87.8	85.1
In Service	12.3	39.4	8.8	47.5	9.6	34.5
Academic Year	14.7	19.3	15.2	3.5	8.7	26.5
Research Participation	2.6	4.7	0.0	2.0	0.0	1.4
Summer Fellowship	7.7	9.1	0.0	11.5	5.1	5.2

the same percentage to Academic Year Institutes (15-19%). The percentage applying to Research Programs and Summer Fellowships is small and shows no difference between the two groups. The Technical Appendices (Appendix A) present distributions of travel for attendance at various kinds of Institutes for the years 1959, 1960, and 1961. These distributions are very spread out, particularly for the Summer Institutes. It appears that people may be coming from farther away in recent years. The year 1959 shows a mode in the distribution at under 25 miles ranging to a mode of 200-500 miles in 1961. Attendance at Inservice Institutes is, of course, also spread out, but the distribution is clustered at the short end with modes under 25 miles and up to 100 miles for the three years.

2. Non-public Schools. In the non-public group, the AR group has applied to Summer Institutes somewhat more often than the AA group (85% vs. 75%). Again, it is the AA group which far and away applies for the Inservice Institutes, showing just under 50% who have applied for Inservice Institutes as compared to just under 10% for the AR group. The AR group also tends to apply proportionately more for Academic Year Institutes (15 vs. 3.5%), but the AA group prefers Summer Fellowships for which they have applied almost 12% as compared to none for the AR group.

Mileage traveled to attend Institutes was again quite spread out for Summer Institutes, showing modes a little higher for the three years than for the senior high schools. As before, mileage traveled for Inservice Institutes was bunched up at the lower end with modes of 25-50 miles in recent years.

3. Junior High Schools. Again, about seven-eighths of both AR and AA groups have applied for Summer Institutes; however with respect to Inservice Institutes the difference is again large and favors the AA group (over a third as compared to 10%). In addition, over a quarter of the AA group had applied for Academic Institutes as compared to 10% of the AR's, while no difference between the two groups is obtained for Summer Fellowship or Research Participation Programs (about 5% and 1% respectively). Mileage traveled to the various Institutes in various years was very similar to the findings for the senior high schools.

4. Summary. The Summer Institutes are most popular, drawing 75-85% of the AA and AR groups. Inservice Institutes are applied for much more frequently by the AA group for all three school types. In non-public schools the AR's tend more toward Academic Year Institutes, and the AA's toward Summer Fellowships.

5. Multiple Application. Table IV-7 presents the average number of applications for various Programs by year and type of school for those who applied for the Program in question. Several points are clear. Both Summer and Inservice Institutes have shown steady growth in popularity with public school teachers over the past three years (progression of weighted N's). The average number of Inservice applications remains relatively constant at about 1.1, with relatively little spread. The average number of applications for Summer Institutes has been increasing, but only slightly for

Table IV-7

Average Number of Applications for Those Who Applied by Year, Type of School and Type of Program (Target)

	1961			1960			1959		
Summer	Mean	S.D.	Wt.N.	Mean	S.D.	Wt.N.	Mean	S.D.	Wt.N.
Public	4.6	6.7	20842	4.6	7.4	17887	4.0	7.0	14092
Non-Public	3.6	2.6	1636	2.5	1.9	1717	2.2	1.6	1466
Junior	5.2	4.9	6496	4.3	4.3	5256	3.7	4.0	4446
In Service									
Public	1.1	0.3	7605	1.1	0.3	5278	1.1	0.2	2712
Non-Public	1.2	0.4	676	1.1	0.3	572	1.2	0.5	696
Junior	1.1	0.4	1486	1.2	0.4	1247	1.0	0.0	790
Academic Year									
Public	2.4	1.9	1958	2.7	2.0	2706	3.5	2.2	1031
Non-Public	3.0	0.0	54	1.0	0.0	54	0.0	0.0	0
Junior	2.8	1.7	563	2.3	1.6	1085	2.7	2.0	887

senior high school teachers as compared to non-public and junior high teachers. However, the standard deviations suggest that these distributions are quite skewed and spread out. Thus, particularly for the public senior highs, some persons have been turning in large numbers of applications. The comparatively small N's for the Academic Year figures make generalization risky, but a decrease in average number of applications is suggested for the senior highs.

The above results do not examine the question of application for different types of Programs. A look at the off-diagonal N's (Appendix B), however, suggests that relatively few of those who apply for one type also apply for another the same year.

F. Professional Activities

1. Senior Highs. There is a distinct positive relationship between application and the number of professional organizations belonged to, and particularly the number of Math-Science organizations belonged to (correlations of .16 and .23, respectively). With respect to NEA membership, the AA group is clearly more oriented toward membership. Only a little over a third do not belong as compared to more than half of both of the other groups. In the AA group a clearly larger proportion belongs to the special Science divisions NSTA and NCTM than in the other two groups.

The above findings correspond very nicely with those reported in the Preliminary Report. Further evidence of the professional nature of the groups is the positive relationship (.13) between the number of journals read and being an applicant, and the stronger relationship between the number of Science journals read and being an applicant (.23). While no relationship was observed between the number of office held in professional organizations and applications, there was a slight tendency for the AA group to engage in a greater number of outside professional activities. However, only about a quarter of all groups report outside professional activities. For those who do have outside professional activities, the major type of activity seems to be in the areas of writing, consulting and research.

2. Non-public Schools. The number of professional organizations belonged to approaches significance in its relationship with application and the number of Math-Science organizations belonged to reached a correlation of .20. A substantially smaller percentage of each of the three groups in the non-public category belong to NEA. However, not quite half of the AA group are members as compared to only about a quarter of the other two groups, and again the AA group tends to outstrip the others in terms of the percentage that are members of the professional Math and Science divisions of NEA.

With respect to reading, there is a correlation of .19 with number of journals read and application, and the highest relationship with application for the non-public group occurs in connection with number of Math-Science journals read (.29). While number of offices held does not reach significance, its trend is in the right direction.

Considering outside professional activities, it is interesting to note that virtually none of the AR group has done anything in this way as compared to a little over 30% of each of the two groups. The modal type of activity is again writing, consulting or research.

3. Junior Highs. Again we find positive relationships between number of organizations and number of Math-Science organizations and the criterion variable of application (.16 and .22, respectively). Again, there are differences in NEA membership, 70% of the AA group indicating that it is a member of NEA as compared to about half of the NA group, and roughly three-fifths of the AR group. Again, the AA group outstrips the NA group in belonging to NSTA or NCTM (29%), but the AR group is very close to the AA group in this respect. Holding professional office has a significant relation to application for the first time in this group. Number of journals read, and particularly number of Math-Science journals read also are significantly positively related to application (.11 and .22). With respect to professional activities outside, the AA group again tends to have more outside activities (about 30%) as compared to a fifth or less for the NA and AR groups respectively. As before, most of these activities tend to be in the area of writing, consulting and research.

4. Summary. In summary, it seems quite clear that professional orientation in terms of belonging to professional organizations (particularly Math-Science organizations) and reading, and to a slight extent outside professional activity and office holding, are related to application. It is the teacher who is more professionally oriented toward Math and Science who is the applicant. These results parallel exactly those reported in the Preliminary Analysis.

G. Financial Data

1. Senior Highs. We find for the senior high group a small but significant correlation between application and salary indicating that there is a small tendency for higher paid persons to be applicants. No relationship appears to exist between application and other income, for application and spouse's income. The senior high sample averages $1,100 of outside income per year and $1,600 for spouse's income.

2. Non-public Schools. As might be expected, due to the differences in salary structure in parochial high schools, there is no relationship between salary and application. There is a negative relationship, however, (-.20), between application and other income. This means that the higher other income, the less likely a teacher is to become an applicant. Similarly, there is a borderline relationship between spouse's income and application (R = -.18). These results suggest that the higher a person's outside income is, for this group, the more likely he is to ignore NSF Programs.

3. Junior Highs. We again find a small but significant relationship between salary and application, indicating that the higher paid teachers are the ones who apply. No relationship between application and other

income or spouse's income exists in this group. This group averages about $1150 per year other income, and about $2210 per year spouse's income.

4. Summary. Thus, there is a suggestion that the higher paid teachers are the ones who become applicants while, at least in non-public schools, those who have outside sources of income do not. These differences may reflect differences in involvement with the field

H. Relationships with School Variables

An attempt was made to relate teacher characteristics and school characteristics in terms of applications. To this end, a matrix was put together composed approximately equally of teacher items and school items. Means, standard deviations, intercorrelations, and weighted N's were run for this matrix and are reported in Appendix C. In order to put these two kinds of information together, each reported school characteristic used was treated as a teacher characteristic for each of the teachers from that school. This means that a given school characteristic was used as many times as there were teachers in the school in order to compute the intercorrelations based on teachers. This intercorrelation matrix, then, has weighted N's which closely approximate the weighted N's for the teacher correlation matrix, and it will be seen that the means, standard deviations, and intercorrelations for the teacher variables are very close to those already reported in that matrix (Appendix B). However, the means, standard deviations, and intercorrelations for the school variables will be quite different in some cases from those reported in the school correlation matrix (Appendix E), due to the fact that each one of these school responses was weighted by the number of teachers in the school in computing these values. (In effect, the means of the school variables in this analysis would represent the average school environment for teachers.) The material presented below is derived from examining the correlation of each of the school variables with the three criterion variables: any application to Summer Institutes, any application to Inservice Institutes, and any application to Academic Year Institutes.

1. Senior Highs. Approximately 52% of all senior high teachers had applied for Summer Institutes at some time during the past five years; 20% for Inservice Institutes; and approximately 12% for Academic Year Institutes. Application for Summer and Inservice Institutes is related to number of secondary teachers in the school. There is a small relationship between application and having delivered NSF brochures directly to teachers. A small, but somewhat larger relationship, exists between starting salary and application for Summer Institutes. With respect to Inservice Institutes, there is a small tendency for low cost housing to be associated with application, also for per cent drop-out and per cent of parents belonging to PTA to be related to application. (The latter, the largest of these relationships, is on the order of .14) Where obtaining additional college credits and obtaining an advanced degree are factors in salary increases, there is a small tendency for these factors to be related to non-application. No relationships with Academic Year Institutes were observed.

2. Non-public Schools. In the non-public schools 37% apply for Summer Institutes; 19% for Inservice Institutes; and only 3% for Academic Year Institutes.

There is a slight tendency for low cost housing to be related to application for Summer Institutes and for drop-out to be related to non-application (that is, the higher the drop-out, the greater the non-application).

Posting of notices tends to be related to non-application in this group of schools, as does salary increase for obtaining additional college credits. The age of the principal tends to be related to non-application while the total number of hours of Math and Science he has had tends to be related to application. The highest relationship in this group is between the principal's recommendation and application (.30). (This latter relationship is understandable since the large number of parochial teachers in this school tend to look consistently toward their superiors for recommendations of this kind.)

With respect to applications for Inservice Institutes, we find again that there is a relationship (.25) between number of secondary teachers and application, also between application and whether or not the principal discussed application with the teachers. An advanced degree as a salary consideration is related positively to application, while percentage of the parents earning $4000 or less tends to be related to non-application. Correlations of .22 and .23 are obtained between starting salary and application and experimental programs and applications. A .28 is obtained with age of the principal--that is, the older the principal, the more likely the application, and there is some trend for more experienced principals to be related to more application. As was the case for the senior high schools, there are no significant relationships for the Academic Year applications.

3. Junior Highs. The percentage of Summer Institute applications for junior high teachers is about 40% as compared to 12% for Inservice and 9% for Academic Year. For Summer Institute application some small relationship is noticed between recommendation of principal, delivering the notices individually, and posting the notices and discussing the matter with the individual teacher. Some small relationship is noted between fewer secondary teachers and more expensive housing and application, and also for increased credits as a salary consideration.

With respect to Inservice Institutes, low class housing is apparently slightly related to application as is per cent of families in the PTA. Factors which are related to non-application, to a slight degree, are delivering the notices individually and both additional credits and advanced degree as factors in salary increases. Again, there are no significant relationships with application for Academic Year Institutes.

4. Summary. It is very interesting to note that the intercorrelations between application at any time for Summer Institutes, Inservice Institutes, and Academic Year Institutes are low for all three types of

schools, and even non-significant with respect to non-public schools. This suggests that a person fixes on the type of Institute which best meets his needs and does not tend to apply for other types of Institutes. In other words, we are not dealing with an "application syndrome".

The findings in this part of the analysis are somewhat conflicting, inconsistent, and consequently difficult to summarize. In general, however, the influence of the principal, either in terms of his recommendation, discussion, individual delivery of notices, or his own Mathematics-Science training seems to be a consistently important factor in getting teachers to apply for both Summer and Inservice Institutes. Further, application seems to be related to larger numbers of secondary teachers (except for junior highs) suggesting that the small school environment does not encourage application.

Applications seem to be inhibited in most cases where salary credit is given for competing activities such as earning advanced degrees or additional college credits.

In the public schools, Inservice Institute applications tend to be related to relatively low cost housing communities with strong school (per cent parents in PTA) support, while high starting salaries or higher cost housing are characteristic of Summer Institute applications. Non-public schools show a reversal of these trends.

It should be emphasized strongly that the above findings are only trends and are [illegible] of great magnitude. They are, however, suggestive and reasonable.

V. Interview Analysis - Target Group

The distributions on which the following analyses are based are found in Appendix G. The correlational analyses in Appendix H were also employed. The analyses below are presented by interview question for each of the three types of schools, public senior, non-public, and junior high schools. The emphasis has been on contrasting the criterion groups.

It was never anticipated that there would be sufficient cases to analyze all possible breakdowns of these data. There were sufficient public senior high cases to make it reasonable to analyze these teachers separately by sex and criterion group. For junior highs the AR and AA Groups were too small to analyze separately, so the analyses are based on males only for these two groups. There were sufficient female NA's to permit comments from time to time. For the non-public schools, however, there were too few cases to analyze at all unless males and females were pooled. This was done, though it seemed a somewhat undesirable combination.

As is explained in the introductory material to Appendix G, multiple responses were coded for some of the interview questions. In the analyses the percentage of the group giving the response at all, regardless of order, was determined by adding together the percentages giving the response for each individual coding position. This means that the percentages represent the percentages of the people who mentioned the theme at all. It produces the seemingly odd result that the percentages add to two or three hundred percent (including "omits"), depending on whether two or three responses were coded. It must be emphasized that the comparisons mentioned in the following material are those which appeared to be of importance. They are not necessarily of equal importance - or stability - and it is suggested that the data presented in the Appendices be examined for further nuances. The problem of applying statistical tests to these data appeared to be unsurmountable due to the effect of factors such as the application of weights, extreme splits of the population proportions (e.g. 90% vs. 10%), and variable N's for the comparisons. As a rough rule of thumb, differences of 10% or more were considered significant in the discussion, with some leeway being allowed at the extremes of the percentage range. It is felt that these procedures have identified most of the solid trends inherent in the data.

Finally, it should be noted that the periodic summaries are just that -- they don't cover everything. In many cases minor exceptions to the trend noted must be ignored or stated as exceptions in order to present the trend. Thus the trends must never be thought of as absolutes, i.e., as applying to all those in the criterion group, particularly as they may often be based on a comparatively small percentage difference among the groups.

A-1. "How did you get into teaching?"

1. Public Senior Highs. Approximately one-third of both males and females appear to get into teaching through the influence of other people such as teachers, families, or friends. As in the preliminary analysis, there appears to be relatively little difference between Applicants and Non-applicants on this point. A higher proportion of males than females mentioned that they got started working or majoring in another field. However, for both males and females this was significantly more true of the AA than the NA Group, supporting the preliminary findings in this respect. The correlational analysis supported this relationship at a borderline level for both summer and inservice applications.

Although there was relatively little difference for the men, almost twice as many (about 31%) of the AA women reported that they got into teaching due to some fortuitous occurence, or because the opportunity or circumstances prevailed. Over 1/3 of both the NA and AA Groups of the women reported an early desire, in high school or before, to go into teaching as compared to approximately 13-14% of the men in both groups. Interestingly, about 22-23% of the women and only about 12-13% of the men reported going into teaching because of an interest in the subject matter. Even more interesting, there apparently is no difference on these two variables between the NA and the AA Groups.

2. Non-public. Almost a third of the AA Group as compared to a fifth of the NA Group mentioned the influence of other teachers as a reason that they got into teaching. On the other hand, three times as many NA's (16%) as AA's mentioned the influence of family as a motivating factor. About 37% of the NA's as compared to 22% of the AA's mentioned that they had started working or majoring in another field. On the other hand, about twice as many AA's as NA's (27%) mentioned that they had become a teacher as a corollary to some other job (for example, "She doubts if she would have become a teacher if she had not become a nun."). Only 18% of the NA's as compared to 10% of the AA's said that they had gone into teaching because of an interest in the subject matter. About a third of both groups credited an early desire to go into teaching as a reason they did.

3. Junior Highs. A somewhat larger percentage of AA's as compared to NA's and AR's noted that they were in teaching through the influence of other people, largely a result of family influence (32 vs. 15 and 18 per cent), particularly for the ladies. As compared to males, females showed a stronger tendency to mention family as a source of influence. The largest influence, however, on entry into teaching apparently is that teaching is a second or a later choice. Almost all teachers indicated that teaching was a second or later vocational choice. About a quarter entered teaching through circumstance or fortuitous opportunity. AA's particularly as compared to AR's with NA's intermediate entered teaching because of early desire in high school or before. Only a modest number of each of the three groups (5 to 10 per cent) entered because of interest in the subject matter. As compared to males, a significantly

smaller percentage (about half) of the female NA Group mentioned that they had started working in another field, but twice as many females entered through an early desire.

4. Summary. The most impressive thing was the diversity of findings among the three school types. Very little can be said in summary that applies across the board. In general it would appear that relatively few of these teachers enter teaching because of subject matter interests; however, more women than men do so. This finding probably reflects the acceptability of teaching as an outlet for these interests for women as opposed to the more masculine occupations of scientist or engineer. The relatively small percentage who enter for subject matter reasons may also be an important explanation for lack of substantive interest in NSF Programs.

As found in the Preliminary Report, the influence of others contributes a good deal toward becoming a teacher in all groups, though the relative importance of the sources of the influence varies from group to group. An early desire to enter teaching seems to be more important for women. The large percentage of each group who came to teaching as a second or later vocational choice is interesting. Males tend to have started in another field more frequently than females, and Applicants more frequently than Non-applicants (in public senior high schools), bearing out the preliminary finding in this respect. The trend for NA's to exceed AA's in the non-public group and for there to be little difference in the junior highs weakens this finding, however.

A-2. "Did you ever consider any other occupation?"

1. Senior Highs. Females answered no to this question about twice as often as males (37% vs. 18%). More females in the Non-applicant Group answered no to this question than either the AR or AA Groups, though there was no difference in this respect for males. However, substantially fewer males in the NA Group had started on another career or had begun to prepare for another career than in either of the other two groups. Also, notably more had considered, though not begun, other occupations as compared to the AR and AA Groups.

2. Non-public. Roughly 2/5ths of both groups indicated that they have never considered any other occupation. Of the others, considerably more of the NA Group than the AA Group noted that they had planned for another occupation to the extent of taking courses or beginning a career, while notably more of the AA Group than the NA Group had considered (21%) another career but had not actually begun on it. These findings are almost the exact opposite of those found for the public senior highs and illustrate the importance of not combining all types of schools in the analysis.

3. Junior Highs. There were relatively few differences among the three criterion groups with respect to ever considering any other occupation. The AR's answered "no" to this question about 1/6th of the

time which was twice as much as the NA's with the AA's intermediate. Approximately 3/5ths of each of the three groups noted that they had started another career, or planned for another career to the extent of taking courses, or actually starting, while around the quarter considered another career and did not begin it. It is interesting to note that over a third of the NA females said "no" to this question as compared to only 8% of the NA males. In addition, the NA females tend to have actually started a career or taken courses for another career considerably less often, but to have considered another one, though not beginning, somewhat more often than the NA males.

4. Summary. A notably higher proportion of females, particularly NA indicate they have never considered any other occupation. However, in the public senior highs those who have considered another occupation to the point of beginning it or taking courses are likely to be Applicants. Just the reverse is true for the non-public schools with the junior highs intermediate.

Thus we find the female to be less venturesome, occupationally, and the Non-applicant (with exceptions) likewise.

A-3. "What do you like about teaching?"

1. Senior Highs. The results in response to this question with respect to student related satisfactions were not as clear-cut as they seemed to be in the earlier report. There was a slight tendency for the NA Group to exceed the AA Group both for males and females in terms of the percentage who marked the rather vague response "working with people, or working with children". Well over a third of each group marked this response. For the females the AA Group shows some slight tendency to exceed the NA Group with respect to seeing students learn, gain knowledge, like and do well in subject matter. However, this does not hold up in the males, where there is essentially no difference among the three groups. Student related satisfactions, overall, were very important, as an average of better than one of these responses per person is obtained for each of the groups in question, both males and females.

With respect to other psychological satisfactions, an interesting sex difference comes up when the categories of variety, intellectual stimulation, and imparting knowledge are combined; the NA exceeded the AA Group by 17.4% to 9.8% for the females, but the difference was in the opposite direction for the males 15.1% to 24.1%. For the category of personal growth and satisfaction, however, results are similar to the preliminary findings in that approximately twice as many of the NA Group as compared to the AA Group mentioned this category (only approximately 15% of the NA Group, however).

Again there was some tendency for the AA Group to mention satisfaction in its professional associations to a greater extent than the NA Group.

While there was relatively little difference on any individual aspect of working conditions, there was a clear tendency for the women in the NA Group to be more satisfied with working conditions than the women in the AA Group (15 vs. 3%). This difference does not hold up for the men, however. Similarly over-all differences exist in the general category of other psychological satisfactions where 51% of the NA women as compared to 37% of the AA women mentioned various other psychological satisfactions. Again, this did not hold up in the male group. It is interesting to note that women in general talked more about a contribution to society and men talked more about the imparting of knowledge, across the criterion groups. Women also tended to talk more about variety as opposed to men, leading one to the interpretation that women see teaching as much less boring than other alternative occupations open to them.

2. Non-public. Student related satisfactions were again far and away the most frequently mentioned items about likes and teaching. The AA Group mentioned this slight amount more often than the NA Group. In the area of student related satisfactions about a quarter of the NA Group as compared to 15% of the AA Group mentions contact with students and being with them as a satisfaction. About a third of both groups emphasizes student development, while an almost equal number of both groups mentions seeing students learn, gaining knowledge, etc. However, 42% of the AA Group as compared to about a quarter of the NA Group mention working with people or children as a satisfaction. Working conditions are mentioned as a like by relatively few of each group - roughly 7%. Other psychological satisfactions in general draw the responses of a little over half of the NA's and a little under half of the AA's. One of the most important of these is the feeling of the AA Group (over a fifth) that they are contributing to society. This compares to only 4% of the NA Group. On the other hand, 12% of the NA Group as compared to none of the AA Group emphasized their own personal growth and satisfaction. Again a significant correlation (-.31) confirms this finding for Summer Institute application.

3. Junior Highs. Over-all, the NA Group gave responses about student related satisfactions slightly more than the AR Group and significantly more than the AA Group. There was an average of well over one per person in this general category. NA's tended to exceed the AA's on working with people, seeing students learn and develop, improve, and gain knowledge, etc. In addition, they distinctly exceeded the AR's on seeing students gain knowledge, do well in subject matter; but not on seeing students develop, improve, become successful adults. NA females did not differ from NA males too sharply on this question.

Working conditions in general did not account for a great deal of the likes, but they accounted for more of them in the AA Group than in the NA Group, and distinctly more than in the AR Group (28% of the AA Group vs. 20 vs. 10). While none of the three groups mention financial reward as an inducement, the AA Group apparently felt that the hours are a good point, and the AA and NA Groups exceeded the AR Group with respect to their liking for summer vacations. Contrary to some earlier findings it is the AR Group that feels they are contributing to society (approx. 1/5th), twice as much as the NA Group and almost three times as much as the AA Group.

On the other hand, personal growth and satisfaction of the teacher is mentioned by the NA and the AA Groups - about 12% and the NA females about 12%, but not at all by the AR Group. As discovered before, it is the AA Group who mentions professional associations with other teachers and organizations twice or three times as often as the NA and AR Groups (18%).

4. Summary. As might be expected with any group of teachers (particularly when subject matter interests were so rarely given as reasons for occupational entry), student-related satisfactions were far and away the most frequently mentioned likes. There was little difference among the criterion groups on this point, however, though NA's might have mentioned these slightly more frequently. The NA emphasis on personal growth and satisfactions was the clearest trend discovered. The tendency for AA's to find satisfaction in their professional associations was also clear though neither of these trends came out in large numbers. The NA's tended to show relatively more emphasis on working with children, while the AA's emphasized their contribution to society (except for junior highs where the AR's stand out on this point).

In general, the picture of the Non-applicant Group as a self-centered group interested in self-satisfactions as compared to contributing and imparting knowledge does not come out quite so clearly here. However, most of the trends evident in the preliminary analysis are discernible. The NA emphasis on personal growth and satisfaction remains, and the most distinguishing feature of the AA Group appears to be its external focus as seen in its satisfaction in professional associations and contributions to society. All groups emphasize working with children, etc, but perhaps not for the same reasons.

A-4. "What do you dislike about teaching?"

1. Senior Highs. As discovered in the Preliminary Analysis, the major dislike of all groups (60-70%) appeared to be working conditions. There appears to be virtually no difference between Applicant and Non-applicant Groups with respect to any of the aspects of working conditions. However, it is interesting to note that almost a third of the men complain about low salary as compared to only 7% of the women, leading to the conclusion that teaching is a much more satisfying occupation financially for women than for men. There was a difference on this variable between the AR Group and the other two groups, about 44% of the male AR Group expressing displeasure with salary levels, as compared to only 32% of the male NA Group and 28% of the male AA Group. The lack of difference between the AA and NA Groups contradicts a finding of the Preliminary Analysis and suggests that the qualification mentioned in the Preliminary Analysis regarding the effects of age on the complaints about salary may have been justified. That is, that the elimination of the young teachers and very old teachers from the Target Group analysis may have eliminated some of teachers who were

responsible for the differences noted earlier.

Paper work of various kinds, particularly keeping records and clerical tasks turns out to be somewhat of a dislike for all groups, particularly the AA Group and the women. About 44% of the female AA Group as compared to 24% of the female NA Group mentioned this as a problem, and over a quarter of the male AA Group as compared to about half that many of the male NA Group also felt that record keeping and clerical tasks are a problem. This finding suggests that the AA Group is more impatient with non-teaching, non-subject-related tasks than the other groups. There is esentially no difference between the NA and the AR Group with respect to this variable.

The Preliminary Analysis noted that the Non-applicant Group reported a great deal more student-related problems than either of the Applicant Groups. It is now very interesting to note that this finding was largely a function of the females in the group, not being true, in general, of the males. Well over 42% of the NA females report problems of this type as compared to 35% in the AR female group and 26% in the AA female group. The corresponding figures for males, however, are approximately 26% across the board for this type of problem. More than twice as many of the NA females as AA females reported problems with discipline, for example, although there was no difference between these two groups for the males, the AR Group having more trouble with discipline, if anything. Almost twice as many males as females reported problems with other people. While there is no difference between the NA and the AA Groups for females, contrary to the Preliminary Analysis findings, the NA Group substantially exceeded the AR and AA Groups in the percentage of males having trouble with outside people (32 vs. about 20%). Further analysis showed that this was primarily difficulties with parents (14.5% vs. 6% for males).

2. Non-public. The prime dislike of both groups, particularly the NA Group in this case, has to do with paper work and so forth, primarily the problems of grading and record keeping. Interestingly enough, the AA Group exceeded the NA Group 2 to 1 on dislike for record keeping, whereas the NA Group exceeded the AA Group about 3 to 1 on its dislike for grading. This may reflect a basic psychological insecurity about evaluation problems with respect to students. As might be expected other areas of dislike included various aspects of working conditions which were mentioned by approximately a third of each of the groups. Again, interestingly enough, the AA Group rather than the NA Group complained about long hours, heavy teaching load, inadequate time, etc. (27% to 17%), whereas there was some small tendency for the NA Groups to complain about physical facilities. Low salary came in for very little mention. The NA Group showed a sharply greater percentage of problems related to other people such as school boards, parents, etc. (23% vs. 5%). These were made up primarily of problems with parents and about half of miscellaneous sorts of problems which have been grouped together under the category of "other problems related to people" (this category includes the administration and general public, etc.).

Comparatively speaking, then, the NA Group emerged as a group concerned about its relationship with the administration, supervisors, other people, etc., concerned about its ability to grade, grading problems, and somewhat less concerned about record keeping in general and about the heavy load of teaching and responsibilities of teaching in general.

3. Junior Highs. As before, working conditions were the chief "beef", with responses to this general category running almost 3/4ths for AR, a little over half for NA, and not quite a third for AA. It is clear that the AR Group is the most dissatisfied, followed by the NA and the AA Groups with respect to working conditions. The AR Group tended to complain about long hours and heavy teaching load. About a fifth of the NA Group complained about physical limitations, and somewhat less of the AR Group as compared to only 5% of the AA Group. Low salary formed a complaint for approximately a fifth of the NA and AA Groups, but over 38% of the AR Group, again marking this group as being a group that is dissatisfied salary-wise. Student related problems came into play for about a quarter of the NA Group and less than a fifth of the AR Group, but a full 2/5ths of the AA Group. Discipline problems seemed to trouble the AA Group twice as much as the AR Group, and three times as much as the NA Group. The other major portion of student related problems was lack of student motivation where more than twice as many of the AA Group as compared to the NA Group, and five times as many as compared to the AR Group mention this problem.

Surprisingly enough, paper work did not come in for quite the comment that it did before, with about a quarter of the NA Group and something around 1/5th of the other two groups mentioning this as a dislike. Of these, half or more comments were centered on the problem of keeping records and various clerical tasks, and only 1/3 on grading. Problems related to other people assumed a comparatively important role in response to this question, where between 30 and 33 per cent of all three groups mentioned this as a problem area. AA's and to some extent AR's appeared to have slightly more trouble with parents than NA's, but in general the percentages were spread around over all aspects of other people, including parents, supervisors, peers, school boards, administration, etc. In general the NA females were pretty much like the NA males with the exception that twice as many of them responded as dissatisfied with record keeping and clerical tasks and twice as many objected to grading.

4. Summary. As was the case in the Preliminary Analysis, the major dislikes for public schools are various aspects of working conditions followed by paper work. The reverse order holds for non-public schools. Again there are differences among types of schools which make summarization difficult. However the AA's tend to be more bothered by paperwork of the record keeping variety and the NA's by grading; females object to the paperwork more often than males.

With respect to working conditions, the dissatisfaction of the AR's with salary conditions is the outstanding difference; males are more dissatisfied than females salary-wise. The NA's tend to feel physical facilities are too limited.

Student related problems such as discipline and student motivation are problems more for females than males and generally more for Non-applicants than Applicants except in the junior highs. Contrary to the Preliminary findings, the Non-applicants appear to have their troubles with outsiders such as parents and administrators. It is the AR's who are not content salary-wise, and the NA's who tend to have both student-related and outsider problems (except for junior highs where the AA's have these problems).

5. "What are your strong points as a teacher?"

1. Senior Highs. With respect to getting along with students, being liked by them, having their respect, confidence, trust, etc., we find that a little over a quarter of the males mentioned this as a strong point with no intergroup differences. About 33%, or more than twice as many, of the AA females mentioned this as a strong point than in the NA Group. These findings are somewhat contradictory to the Preliminary Analysis where the AR Group stood out in the mention of this strong point.

With respect to teacher to student relationships, where the emphasis is on the teacher's attitude toward the students, it is interesting to note that for the males there was a distinct tendency for the AR Group as compared to the AA Group to emphasize as its strong points its abilities to get students to work, and patience, understanding and personal interest in students (67.5% vs. 51% vs. 43%). With females it was more the Non-applicant Group which emphasized this area as a strength (44% vs. 35% and 32% for the AA and AR Groups). As compared to the NA and AA Group, the AR males, particularly emphasized understanding students by about 3 to 1, whereas the NA Group emphasized 2 to 1 its personal interest in students for both males and females.

With respect to subject matter preparation, the situation was much the same as it was for the Preliminary Analysis. That is, the AA Group emphasized this as a strong point considerably more than either the NA or AR Groups (35-40% for both males and females). A borderline significant correlation for this variable and Academic Year Application was observed. On the other hand, the NA Group tended to emphasize interest and enthusiasm for subject matter about twice as much for both males and females as the AA Group. This assumes all the aspects of a rationalization. There appeared to be relatively little difference in the percentage of the two groups for males or females choosing effective teaching methods or discipline as a strong point. This latter point is born out by a small negative correlation between Summer Institute Application and discipline as a strong point.

2. Non-public. Again the AA Group (about 2 to 1) noted its personal relationship with students, getting along well, having students' respect, etc., as being strong points. The personal level of teacher to student relationships is interesting in that over-all this category was mentioned approximately 53-55% of the time by both groups. Roughly 3/10ths of each group felt that they have the ability to instill enthusiasm, interest, etc., but the NA Group seemed to feel more patient and understanding (about a quarter) as compared to the AA Group (about 5%). On the

other hand, the AA Group cited its personal interest in students (11% vs. 0). The area of subject matter strength is of course also of interest, and as might be expected the AA Group far outweighed the NA Group in its general choice of this as a strong point (57 vs. 37%). Again the correlation with Academic Year Application approached significance. The groups appeared to feel about equally as to their interest and enthusiasm for the subject matter, but the AA Group exceeded the NA Group 35% to 24% regarding feeling well prepared in the subject matter. It is in the area of communication that the NA Group apparently felt the strongest (57% of this group choosing this area as compared to only approximately a fifth of the AA Group. The real difference in this category was with respect to use of effective teaching methods where the NA Group cited this as a strong point, almost 4 to 1 over the AA Group (about 40%). On the other hand, almost a third of the AA Group felt that effective discipline was a strong point as compared to only a little over a fifth of the NA Group. Thus, comparatively speaking, the NA Group feels itself effective in teaching and teaching methodology, that is, technique-wise and also strong in its patience and understanding of students. On the other hand the AA Group comparatively seems stronger in effective discipline and subject matter preparation.

3. Junior Highs. There appeared to be relatively little difference in strong points with respect to things like being friendly, being liked by students, getting along well with students, and so forth. Approximately a quarter of NA's, AA's and NA females gave this response, and slightly more of the AR Group. With respect to personal level of teacher to student relationship a significantly larger number of the NA Groups (over 3/5ths) mentioned this than either of the AR or AA Groups, and an even larger number of the NA females (close to 3/4ths) gave this response. With respect to instilling enthusiasm and getting students to do the work, about 15-17% of NA and AA Groups felt that this was a strong point as compared to only 6% of the AR Groups. With respect to the other aspects of teacher to student relationship, patience, understanding and interest, respecting students, it was the NA Group that led the way, as noted before. There were relatively few differences in the AR and AA Groups, although about twice as many (15%) of the AR Group mentioned understanding students as with AA Groups. Comparisons with the NA females were not particularly different, except that a somewhat larger percentage of NA females (over a quarter) mentioned getting students to do their work as a strong point. About 15% stressed their patience, which is three times as many as NA males.

As to the matter of subject matter strengths, the AA Group again stands out (45%). A significant correlation with Inservice Application was also noted (.21). Most differentiation here comes in the category of being well-prepared in subject matter. There was no difference among the three groups with respect to use of good self expression and ability to get the work across. It was in the matter of effective teaching methodology that the NA Group feels somewhat deficient. This is interestingly different from the non-public analysis earlier. Slightly more of the AR Group mentioned that they have effective discipline as a strong point (26%) than the other two groups. A small correlation between discipline and Academic Year Application was also noted. One of the big experiencial points mentioned by the AR Group (over a sixth) as compared to the other two groups, particularly the AA Group, was their experience in other jobs and other disciplines, a broad background, varied experience. On the other hand, 13% of the NA Group as compared to 6% of the AR and 2% of the AA mention planning and organization as one of their significant strong points. This is not mentioned at all, however, by females in the NA Group.

4. Summary. Again there are interesting differences among the three types of schools which make summarization difficult. One thing is clear, however, across the board the AA's regard themselves (probably rightly so) as being better prepared subject-matter-wise. There is on the other hand little difference between the AA's and NA's on their reported interest and enthusiasm for the subject matter. In general, however, the NA's and AR's more frequently cite their patience, understanding and personal interest as strong points with the AR's emphasizing understanding. There is some tendency for females to mention these points more often than males. In general the AA's appear to have the edge in feeling that they are liked and respected by their students. The use of effective teaching methods is an NA strong point for non-public schools, but an AA strong point for junior highs; whereas discipline tends to be a strong point for Applicants except in public senior high. Contrary to earlier findings, if anything, it is the NA's who feel better able to put things across on the students own level.

A-6. "What are your weak points as a teacher?"

1. Senior Highs. The differences here were insignificant among groups in the preliminary analysis and relatively little in the detailed analysis becomes clearly significant here. There was perhaps some tendency in the female groups for the AA Group to express a greater percentage of problems with the broad category of teacher-student relationships which includes patience, discipline, handling of individual groups, motivating students, and so forth (58% as compared to 45% for the other two groups). This category was definitely the most important weak point mentioned by females, approximately 50% of the responses belonging to this item. About 3/8ths of the group mentioned subject matter deficiencies as a problem, followed by 1/5th who mentioned communication problems. With respect to the males, there is a clear difference between the AR and the AA Groups with respect to discipline problems where the AR Groups have the most trouble (12% vs. 4%) and difficulty in handling individual and group ability differences, where the AA Group has the most trouble (12 vs. 5%). In addition, about 15% of the AR Group expressed difficulty in budgeting their time properly as compared to 4% of the NA and 7% of the AA Groups. The primary problems for the males turn out to be 56% subject matter deficiencies followed by about 3/8ths having a problem with teacher-student relationships, and a little over a fifth having communication problem.

In general, the sex differences here are interesting, in that women tend to have more problems with the teacher-student relationship, and men more problems with subject-matter deficiences. It should be pointed out that this may be due to two sources: one that there really is this difference, and two, that the women fail to perceive themselves as subject-matter deficient whereas the men do.

2. Non-public. It seems clear that the most significant weak point indicated by either of the two groups was indicated by the NA Group with respect to subject matter of preparation. About 3/5ths mentioned this as a problem as compared to only 16% of the AA Group. The difficulty apparently arises both on subject matter deficiency where about a third (twice as many) of the NA Group mentioned this as a deficiency, and on keeping up to date on new developments, a quarter of the NA and none of the AA Groups mentioning this as a weak point. With respect to teacher-student relationships, somewhere around 30% or so of each group appeared to have some problem in this area. These problems, however, were well distributed over several types of problems and though the relationships are probably not significant it might be noted that the AA's mentioned (about 11% to 0) that they expect too much of students and they also have some difficulty in handling individual group differences. On the other hand, the NA's (8% to 0) mentioned problems in being too easy going. With respect to communication weak points about a fifth of the NA Group and slightly less of the AA Group mentioned that they find some difficulty with instructional methods or find it difficult to communicate at the students' level to explain, etc. Another problem for both groups (12-16%) was the problem of inadequate or misallocation of time. Almost none of the NA Group and actually none of the AA Group mentioned discipline as a problem.

3. Junior Highs. The NA Group clearly noted a larger proportion (over a third) of weak points in the area of teacher-student relationships (as compared to 22.5% AA and 8.8% AR). One of these was being too easy going which was mentioned by 10% of the NA's and none of the AA's, but the remainder were spread among a number of different categories including motivation, expecting too much of students, lack of patience, discipline, etc. Over all the most important weak points mentioned were in the area of subject matter problems (some 63% of the NA Group as compared to 55% or so of each of the other two groups). The problems here turned out to be approximately 40% mentioning subject matter deficiency as compared to some 10 to 15% mentioning keeping up to date on new developments. The specific point mentioned by the AA's about two to one as compared to the NA Group was the problem of instructional methods and finding it difficult to communicate at the students' level (mentioned by a fifth of the AA Group). Organizing seemed to be slightly more of a problem for the AA than the other two groups particularly the AR Group. The AR Group mentioned personal shortcomings of various types as being their weak points with almost a quarter of the group mentioning something in this category, as compared to only 10% of the NA's and 7½% of the AA's.

4. Summary. The differences among criterion groups are not particularly strong here. Subject matter deficiencies were the major problems mentioned, and particularly in the non-public schools, the NA's tended to mention this more frequently than AA's. Also, men found this a problem more than women. There were slight tendencies for the AA's to have trouble adjusting to group and individual differences, and for the NA's to be too easy going. Teacher-student relationships in general were the second largest category of problems, but these were spread over a number of sub-problems such as discipline, motivation, etc. The AA's tended to have some difficulty in communicating and in expecting too much of their students. The AR's had relatively more trouble with discipline and personal problems and shortcomings.

A-7. "What do you expect to be doing five or ten years from now?"

1. Senior Highs. There was some small tendency for the AA Group to be most satisfied with teaching Math and Science, particularly for the females. Some 55% of all males gave this response as compared to 65% of all females, but in the females it was 67% of the AA Group as compared to 59% of the NA Group, whereas in the males the percentages were approximately equal.

There was a considerable difference in the groups with respect to their desire to teach at a higher level. For the females, about 10% of the AA Group, as compared to only 1% of the NA Group gave this response, and for the males it was 12% of the AA Group as compared to 7% of the NA Group, but both of these were overshadowed by a full 23% of the AR Group. A correlation of .19 was observed between this variable and Summer Institute Application. A fairly substantial proportion of the male group reported wanting to go into administration, led by the NA Group at 15% as compared to 6% for the AA and 4% for the AR Group. This response was not given very much by our female sample.

It would appear that somewhat more of the AR and AA Group as compared to the NA Group for the males would like to get out of education and vice versa for the females. A distinctly larger proportion of the NA Group is undecided, however, as compared to either of the other two groups. Thus, it would appear that for the AA Group particularly there is a fairly clean division into those who are pretty well satisfied to stay in education and approximately where they are as compared to those who want to get out. While for the NA Group the hard core of those who want to stay in education is apparently a little smaller, and there is a large undecided proportion.

2. Non-public. It is interesting to note that over 90% of the NA Group felt that they will stay in education as compared to a little over three-quarters of the AA Group. About 5% of each group appears to be definitely planning to get out of education and 11% of the AA Group as compared to 4% of the NA Group seemed to be undecided about the whole thing. Strangely there was a correlation of .48 between plans to get out of education and Academic Year Application for this group. Of those who plan to stay in education 84% of the NA Group and only 68½% of the AA Group plan to do the same thing as they are currently doing. Going into administration was the ambition for 7½% of the NA Group and approximately 5% of the AA

Group would like to teach at a higher level. In spite of this small percentage a significant correlation (.35-.37) was observed between this variable and applications for Summer and Academic Year Institutes. It should be noted that all of those who are undecided in both groups tended to have a pre-disposition to stay in education. Thus it would appear that the NA Group is perhaps a little more set in doing what it's doing indefinitely and the AA Group is perhaps a little more self-critical of its position and interested perhaps in looking around.

3. Junior Highs. The AA Group apparently has solidly decided to stay in education (98%) whereas the AR and NA Groups are not quite so solid in their beliefs (85% and 92%). Approximately 6% of the AR Group intended to get out of education and another 6% was undecided while in the NA Group 5% was undecided and only 2% definitely intended to get out. The picture for the NA females was virtually identical to that for the AR Group. Around a half of the responses fell in the category of doing the same thing as now, although it was a little more than half for the AA and a little less than half for the AR. On the female side a full 70% or better marked staying and doing the same thing as now. About 17 or 18% of the NA and AA Groups would like to teach but at a higher level as compared to only 12% of the AR Group. The other activity which seemed to be of interest was going into administration which was given by about 9 to 13% of the three groups. Another 10% of the AA Group was undecided between teaching Math and Science and going into administration. It should be noted that in the AR Group those that want to get out of education are all those who intend to retire. Thus it appears to be a little overt dissatisfaction with the field being expressed with most of the people who don't want to do the same thing aspiring to upward mobility of one kind or another.

4. Summary. Most of all groups intend to stay in education. Some of most groups would like to move into administration or higher level teaching, however, there is a tendency for the AA's particularly females, to be more satisfied with teaching Math/Science than the others except for the non-public schools where more of the NA's than AA's plan to do the same thing they are currently doing. This is supported by the tendency of Academic Year Applicants to want to get out of education for the non-public group. In the senior highs the Applicants, particularly AR's are more interested in moving to college teaching. Going into administration is the desire of slightly more of the NA's. Somewhat more NA's are undecided in the public schools and vice versa in the non-public schools. There is little difference in the percentage who want to get out of education (3-10%).

A-8. "How do you expect to accomplish this?"

1. Senior Highs. No response was given by a large number of respondents (more than half in each case), however, the most popular response numbering approximately a quarter of the men and about a sixth of the women was to get an advanced degree. Approximately 8% of the men and 8% of the women noted that they would attend institutes or take courses,

keep studying. It is interesting to note, however, that while there is no difference among the AR and AA Groups for the males, somewhat more of the NA Group than the AA Group for females mentioned getting an advanced degree (19% vs. 12%) while on the other hand somewhat more of the AA Group mentioned keep studying, or attend institutes than the NA Group (15% vs. 5%).

2. Non-public. This question drew a large percentage of no response (almost two-thirds of the NA and almost three-quarters of the AA Groups). About 19% of the NA Group as compared to 10% of the AA Group mentioned that they would like to get ahead by getting an advance degree. About 15 or 16% of both groups mentioned that they would attend institutes and keep on studying.

3. Junior Highs. The favorite device to accomplish their aims appeared to be getting an advanced degree. This was given by two-fifths of the NA Group, slightly less of the AR, and only one-fifth of the AA Group (it should be noted that almost two-thirds of the AA Group did not respond to the question while between two-fifths and one-half of the other two groups did). About 15% of the AA Group as compared to 12% of the AR and 5% of the NA gave the response attend institutes or keep studying.

4. Summary. The data did not seem definitive in comparison of the groups on this question but it would seem in general that the most widely seen avenue for advancement of one kind or another is getting an advanced degree rather than attending institutes or workshops.

A-8a. "Do you find it necessary to devote much time to keeping up with developments in your field? In what ways?"

1. Senior Highs. The NA Group for both males and females exceeded the Applicant Groups quite sharply in saying that there is no need to worry about keeping up. Approximately 13-14% of the NA Group said this as compared to 4% and 1% of the AR and AA Groups for males, whereas the figures for females were 13% of the NA Group vs. about 10% of the AA Group. Somewhat more of the AR Group expressed need without any action implied.

These findings are similar to those of the Preliminary Analysis. With respect to willingness to take courses, lectures, seminars, workshops, etc., more than twice as many AA's as NA's expressed a willingness to do this to keep up. This was true of both males and females, although males expressed a greater willingness than females (35% of the AA Group, males; and 22% of the AA Group, females). The AR Group appeared to be somewhat intermediate, but closer to the AA Group in this respect. The NA Group appeared much more willing to do some reading, however, and approached the AA Group (37% vs. 42%) on this variable with the AR Group running at a low 31% here. For the females there appeared to be relatively little difference between groups, approximately 35-36% expressing this option.

With respect to keeping up through professional organizations, activities in professional organizations, and so forth, the AA Group exceeded the

NA Group and the AR Group in the males (10 vs. 4 and 3), but only 3-5% of the females mention this as a possibility. In summarizing there is apparently little difference among the females in total specific actions they are willing to do to keep up (68% mentioning something), but in the males there is a strong tendency for the AA Group to exceed the other groups (about 9/10ths as compared to 3/5ths) in its willingness to do some kind of activities in keeping up. The correlational analysis also shows the Inservice Applicants tend to be more willing to take specific actions to keep up. Among the females, by far the most popular method of keeping up is reading which draws approximately 3/8ths or so of both males and females. This was one of the most popular single activities among the males also.

2. Non-public. In contrast to the public senior high group, none of this non-public mentioned that they felt that they had no need to keep up. In addition relatively few (5-8%) expressed need without some specific plan of action. A correlation of .30 was found between specific actions and Summer Institute Applications. The NA Group leaned toward taking courses, lectures, workshops, and seminars somewhat more than the AA Group (18 versus 10%), but the major course of action for both groups was reading of periodicals, books,and journals. Another important aspect for particularly the AA Group (about 1/5th) was activity in professional organizations. This area did not seem to be of quite so much importance to the NA Group (about 13%). In general, it would appear that reading is the primary avenue of keeping up for these two groups particularly for the AA Group with the attendance of lectures, workshops, seminars, etc., being only about half as important to the NA Group and about 1/4th as important to the AA Group. However, activity in professional organizations seems a good bit more important to the AA Group.

3. Junior Highs. A difference was found in the groups here with some 12 to 15% of the NA and AR Groups expressing no need or concern about keeping up as compared to only 3% of the AA Group and again with some 10 to 12% of the AR and NA Groups as compared to 5% of the AA Group expressing need without some action. On the other hand, almost 3/5ths of the AA Group, but only about a quarter of the other two groups are planning specific action such as courses, lectures, workshops, and seminars. Specific action was found to be related to Inservice Application. About 1/3rd of the NA and AA Groups intend to do some reading to keep up and less than a quarter of the AR Group responded in this fashion. Interestingly enough, none of the AA Group this time expected to keep up through activities and professional organizations. The figures for the female NA's look much the same as for the male NA's with the exception of reading where well over half of this group as compared to only 32% of the males expected to keep up by reading.

4. Summary. It seems quite clear that the AA's recognize far more strongly the need for keeping up, and by specific means. In general the AR's recognize the need but tend to do less about it than the AA's. The AA's tend to see courses, workshops, etc., as the avenue for keeping up, along with reading and professional organizations. The NA's prefer

reading (as do women in general), but the AR's rank lower in this. Non-public school teachers are less oblivious of the need, but tend to rely on reading as the means of keeping up. Professional activities are of less importance in the junior highs than in the other schools - perhaps again an indication of a low degree of professionalism in these schools.

B-1. "Are you familiar with NSF Teacher Training Programs?"

1. Senior Highs. As might be expected, the AR Group shows a distinct tendency to be more familiar than the NA Group in both males and females (about 2 to 1 for females and about 3 to 2 for males). About 80% of the females and 76% of the males in the AR Group gave responses which indicated they had a substantial degree of familiarity and were well informed about the program. Most of the remaining Non-applicants indicated some familiarity, but 11% for both males and females in the Non-applicant Group indicated that they were not familiar with the programs as compared to none of the AR Group in each case. Approximately 12% of the NA males and females, and 11% of the AR males, and 20% of the AR females did not provide a response to this question. It can probably be safely assumed that these persons are in the partially uninformed categories.

2. Non-public. Not quite three-fifths of the NA Group indicated that they were familiar and informed about the programs, and approximately a quarter indicated some partial information.

3. Junior Highs. The AR Group outweighted the NA Group 2/3rds to a little over 1/3rd in its degree of familiarity. The NA Group, however, possessed some partial familiarity (about 28%), but 18% of the NA Group as compared to none of the AR Group was categorized as being unfamiliar.

4. Summary. In general, the AR Group exceeds the NA Group in its familiarity with the Programs, though some 80-90% of the NA's apparently have at least partial familiarity with them. As might be expected the correlational analysis showed familiarity to be related to application in most cases.

B-2. "How did you first hear about them?"

1. Senior Highs. The most important response to this question for all groups was NSF brochures. However, this was a more important source for the AA Group both for males and females than for either of the other groups, not quite half of the AA males, and 55% of the AA females giving this response as compared to 34 and 38% of the Non-applicant Groups respectively, and approximately 38% of the AR Group.

Reading professional journals was mentioned by 6-12% of the groups. Approximately 12 or 13%, or so, of all groups first heard about this from principals or supervisors. This might appear to be quite low in comparison to what the potential impact of principals and supervisors might be. Other teachers represented only a small source from about 9 to 13-14%.

2. Non-public. There seem to be some distinct differences in the avenues through which the teachers in the NA and the AA Groups obtain knowledge about NSF Programs. Over a fifth of the NA Group noted that it got information from other teachers as compared to none of the AA Group, while the AA Group was stronger in emphasizing its principal or supervisor (16% vs. 4%), and professional journals, periodicals, etc., more than three to one (26% vs. 8%). NSF brochures and circulars did not form a particularly important source of information for these groups accounting for only a little over a fifth of the NA Group and about 16% of the AA Group. This emphasizes the communication lacks that seem to exist for non-public schools. In summary, the main avenues of communication for the NA Group appear to be other teachers and NSF brochures, while the main avenues for the AA Group are professional journals, periodicals, etc., followed by principals and supervisors and NSF literature.

3. Junior Highs. Some 10 to 15% of the groups became informed through other teachers, and 18 to 20% of the NA and AA Groups learned about the Programs through principals or supervisors as compared to only 12% of the AR Group. The most important source for all concerned was NSF brochures, circulars, and local university material, but this is much more important for AA's and AR's (over 2/5ths) and for NA's (28%).

4. Summary. Relatively few group differences exist for public schools, brochures and NSF literature being the most important sources, particularly for AA's. This source is much less important in non-public schools where AA's depend on professional journals and principals and supervisors recommendations relatively more than NA's who get relatively more information from other teachers. Brochures are an important source for AR's, but principals are not. These findings suggest that more effort might be placed in distributing literature in the non-public schools and in obtaining principal's recommendation.

B-3. "As you understand them, what do you see as the basic purposes and values of the Programs?"

1. Senior Highs. The most important finding in response to this question was that the AA Group far outweighed the NA Group and the AR Group for both males and females in the percentage who mention up-dating and broadening background. About 3/4ths of the men and a little over half of the women in the AA Group mentioned this as compared to a little over half of the NA and AR men, and about 37% of the NA women. It should be noted, however, that for both men and women this was made up primarily of a strong difference in the percentage mentioning up-dating, and a relatively small difference in the percentage mentioning broadening, AA as compared to NA Groups. It should, however, be noted that the NA Group shows a strong tendency to fail to respond to this question as compared to the AA Group, and that the AR Group also shows a similar tendency as compared to the AA Group.

These findings suggest that the NA Group is well aware of the need for broadening its background, but does not feel the need for up-dating nearly as acutely as does the AA Group. There was relatively little difference among the men in the emphasis of improvement of teaching techniques and skills, this running about 13 per cent with perhaps a little more emphasis on this by the AR Group. However, this point was mentioned by almost a quarter of the AA females as compared to only 7.5% of the NA females. These findings lead to the conclusion that the men are much more subject matter oriented, while the women tend to be somewhat more methodology and technique oriented.

2. Non-public. About 32% of the NA Group (twice as many as the AA Group) saw the basic purpose of the Programs as up-dating subject matter knowledge. On the other hand, somewhat more of the AA Group (37% vs. 29%) saw the basic purpose as broadening subject matter background. About a fifth of the AA Group as compared to only 8% of the NA Group mentioned the improvement of teaching techniques, skills, and methodology.

3. Junior Highs. Well over 2/5ths of the AA Group saw the primary value as up-dating subject matter knowledge as compared to approximately 1/5th of the other two groups. In addition, 55% of the AA's saw values in broadening subject matter background, etc, as compared only 35 to 38% of the other two groups. Some 15% of the AA's and 13% of the NA's mentioned the improvement of teaching techniques and methodology as compared to 6% of the AR's. Figures for females were about the same except only half as many gave the reason of broadening subject matter background. NA's are characterized by a high percentage of non-response on this question as compared to AA's.

4. Summary. In summary, the results were similar to those of the Preliminary Analysis. The main purposes of the Programs were seen as up-dating and broadening subject matter backgrounds. The AA Group mentioned broadening more often than the others in all school types. They also exceeded the others on up-dating for the public schools, but for non-public it was the NA's who emphasized up-dating. Males more than females appeared concerned about these points.

Improvement in teaching techniques came in for mention more by the AA's than the NA's for high schools, but in junior highs both NA's and AA's exceeded the AR's on this point. Broad generalizations were featured by substantial portions of each group.

B-4a. "Why did you decide to apply?"

1. Senior Highs. There are two major categories of reasons which both the AR and the AA Group supplied. The first has to do with improvement concepts, of one kind or another, and the second has to do with personal reasons, which boil down primarily to financial assistance expected from the Program in cases where the Applicant felt that he had to support himself during the summer and felt that the financial support offered by the Program during the summer was a plus factor. It should be noted that the AA Group mentioned the financial benefits of the Program much more often, more strongly, than the AR Group. For the males about 2 to 1 (about 26 to 13%), whereas only 6% of the females mentioned financial assistance directly; another 6% specifying other kinds of personal reasons. Thus it appears that males, and particularly AA males mention personal

reasons, largely financial assistance, much more often than the other groups.

With respect to some details on the types of self-improvement featured by these various groups, both the AA males and females went pretty much hand in hand on the most important aspects of this problem. Well over a quarter of each group mentioned staying up to date in the field. About 15 to 18% mentioned becoming a better teacher, that is, improving teaching skills. About 14 to 16% talked about working for advanced degree, the idea here being that they attempt to get a degree under this Program. The only difference here is that almost twice as many of the males as opposed to the females (about 31%) mentioned increased subject matter competence as the important aspect of their improvement. As compared to the AR Group in the males, it appeared that the AR Group was a little less interested in the up-dating aspect, but a little more interested in increasing subject matter background. They were significantly lower in their interest (1/3rd as much) in being a better teacher and improving in teaching skills and somewhat lower in their interest in getting an advanced degree.

It remains interesting, as it was in the Preliminary Analysis, that financial and/or professional advancement does not crop up as a volunteered reason for application to these Programs, the maximum occurance of this reason being somewhere about 2 to 4%. It is again interesting to note that less than 3% over-all of the AA and AR Groups combined report that they applied because of the encouragement or urging of their principals, department heads or colleagues.

2. Non-public. Taking a look at the AA Group, some 73% gave one or more of the improvement concepts. These came largely from three categories, increasing subject matter background competence given by a little over 2/5ths, while working for an advanced degree was given by 15%, and keeping up to date in the field by some 11%. Generally speaking the results here are much the same as for the public senior high schools and emphasize the importance of subject matter background competence, on the one hand, and to a somewhat lesser degree keeping up to date in the field. It is interesting to note that only 11% marked that they had been steered to application by their supervisor or principals.

3. Junior Highs. About twice as many of the AA as AR mentioned the self-improvement general category. The only other category to get any significant amount of mention was the personal reasons category, while the next highest mention was 7.5% of the AA Group and 3% of the AR Group were urged by their principals, department heads, or other colleagues to apply. In taking a look at the detailed categories under self-improvement, we find that about a third of the AA's as compared to only 6% of the AR's mentioned keeping up to date in the field. Some 45% of the AA's as compared to about 29% of the AR's stressed an increase in subject matter background and competance. This proved to be the most important single category for each group, and becoming a better teacher and improving skills and methodology was important for 15% of the AA, but only 3% of the AR, while working for an advanced degree was mentioned by about 15-17% of each of these two

groups. All of the personal reasons category for the AA Group came from the financial assistance aspect, and this was the most important also for AR.

4. Summary. In summary, then, financial assistance and self-improvement are the major reasons for application, self-improvement taking the form of primarily keeping up to date, and increasing subject matter competency with a sprinkling of increased methodology and the possibility of advanced degree programs. Men and women differ only insofar as the women are somewhat less interested in broadening and increasing their subject matter competence. Rejectees and Attendees differ primarily in the lower emphasis of the Rejectees on keeping up to date as compared to broadening their subject matter background, and their lower emphasis on financial benefits. The AA's also express more interest in improved teaching skills. It might be hypothesized that the Rejectees are a group who feel a need for additional subject matter, but feel reasonably confident in most cases that what they have is all right, and thus apparently may have closed their eyes to some extent to the fact that the subject matter may get out of date.

B-4b. "Why did you decide not to apply?"

1. Senior Highs. In general the reasons for Non-application are approximately the same for males and females. Far and away the most important (over half of the males and 72% of the females) was other obligations. The next most important general reason was a feeling by approximately a quarter of each of these groups that the Programs were not relevant for them personally in one respect or another. Some approximately 12% of each of these two groups gave reasons for non-application that might be termed low-drive level sorts of things, and approximately 12-13% considered themselves ineligible.

With respect to "other obligations", 15.5% of the males mentioned family obligations as a problem, while a full 54% of females feel that this is a major reason for their non-application. With respect to financial requirements, whether or not they can make more money in a different summer job, or whether they have a permanent summer job, about 11% of females as compared to 19.4% of males mentioned this as a reason. Within this same "other obligations" category, 8% of the males, but only 4% of the females said they don't apply because they are working on a degree at some other location, or in some other field.

With respect to the general area of feeling that the Institute Programs are not relevant, about 11% of the women said that they simply felt that they had enough education, whereas this was not much mentioned by the men. About 7% said that the Institute Programs are not relevant because they plan to teach or will teach in areas other than Science or Math; location is an important aspect, particularly for women (approx. 12%) and for 5% or so for the men. About 3-5% felt that their background was inadequate, and 7-9% felt ineligible for Institutes for the reason that they don't have sufficient experience.

2. Non-public. As before, other obligations form the most important reason for non-application. These are split up among family obligations, working for a degree, and miscellaneous, and account altogether for about 30%. The next highest reason for non-application is 22% for location. In effect, this means that the location is not convenient or that it would be more convenient if institutes were located closer by. The remaining importantly chosen reasons for non-application are: there is some feeling expressed by about one-sixth that their background was inadequate, the requirements were too high, and so forth, and about another sixth felt that they must wait for their superior (probably these are parochial again) to make the first moves. A smattering of other reasons are given including the presumption of ineligibility because of lack of experience (7%) and institutes not appropriate in content or level (8%). Allowing for the effect of parochial schools, it appears that the findings here are quite similar to those in the public senior high schools.

3. Junior Highs. As found earlier, the most important general category for non-application was other obligations. Almost 2/3rds of the NA males and slightly less of the NA females gave responses in this category. The next most important general category were reasons which classified into low-drive level. These accounted for approximately a fifth of the males and 3/10ths of the females. The feeling of inadequate background expressed by 12-18%, and finally, ineligibility for one reason or another or non-relevance was mentioned by 15%-18%. In addition to the above, the males mentioned ineligibility in 13% of the cases as compared to only 6% for females.

In the category of "other obligations" far and away the most important for the males was the feeling of almost a quarter of them that they could make more money at some other job, or that they have some permanent summer job. This feeling was not nearly so prevalent in the females (9%). On the other hand, the females, over 2/5ths of them, as has been found before, mentioned family obligations as the big drawback. This was a drawback to only 12% of the males. Finally, about 12% of the males as opposed to only 3% of the females said that they were working for an advanced degree. Little outstanding was found in the low-drive category. The most prevalent issue here for both males and females was something generally classified as other time demands, and essentially a miscellaneous category (some 8-12%). The big issue in the non-relevant category for the males was that 10% of them planned to teach in areas other than Math or Science, as compared to 3% for the females. About 9% of the females mentioned that they felt Institutes were not appropriate in level or content as compared to 2% of the males.

4. Summary. The main reason in all cases for non-application was given as other obligations. For females this took the form of family obligations, for males it was financial requirements of some kind. These don't necessarily indicate inadequate stipends but may reflect summer jobs

of long standing, other opportunities, and a general feeling of commitment. The correlational analyses suggested that "Other Obligations" is not as strongly related to non-application as self-improvement themes are to application. Other (miscellaneous) time demands ranked as a deterrent, as did miscellaneous feelings that the Programs were not relevant. Location was a deterrent for non-public school teachers and poor or inadequate background was mentioned by all groups (men more than women usually).

Of course, family obligations for the women are understandable, probably constitute a significant portion of non-application for the women, and probably constitute a group that will be difficult to induce to apply for training programs.

With respect to irrelevance of the program, for the teachers it is probably that there is a fairly solid basis for at least some of the feeling that the Program is irrelevant as there are groups of these teachers who do intend to teach in other areas, for whom there really is an irrelevance. Note, however, that the use of Target group has balanced out most of those who are near retirement or too old, and thus would normally fall in this irrelevant group. The group of women who simply feel that they have enough education probably represents a somewhat complacent, non-motivation group, as do the groups who feel that they have other time demands and who want their summers free, and so forth.

As was found in the Preliminary Analysis, there is a significant group who feel that they are ineligible for one reason or another--usually experience, or something of this kind--and it is quite likely that these represent a group who are again partially ineligible through actual fact, and partially ineligible because of fancied reasons, or fearful perceptions of the situation.

While the group who felt that application was futile, the requirements were too high, or something of this kind, has diminished percentage-wise from the Preliminary Analysis to 4 or 5%, with this possible exception the analysis presented in the Preliminary Report seems to be reasonably appropriate in most respects.

B-5. "Have you ever talked with any other teachers who have attended any such Programs? If so, what did they have to say about them?"

1. Senior Highs. The sharpest difference between the NA Group and the AA Group in response to this question was in the category of "no discussion" - that is, never have talked this thing over, or any discussions of these programs with other teachers. A fifth to a quarter of the NA Group, both sexes, mentioned this as compared to only 1% or so of the AA Group. There was also a sharp tendency for the AA Group to display more of a mixed, positive reaction to Institutes than the NA Group. Almost a third of the AA males as compared to 6% of the NA and 13% of the

AR, and a sixth of the AA females as compared to 3% of the NA females presented some mixed reaction to the Programs. This was based, presumably, at least partially, on greater familiarity with the details of the Programs and also perhaps on greater psychological freedom to criticize the Programs. A generally positive reaction by at least 50% or so characterized the NA's and AR's. A significant proportion (about 10%) of the NA and AA Groups of the males had discussions which indicated that the Institutes were heavy in workload and in subject matter difficulty. The general conclusion of the Preliminary Analysis appears to hold in summary here. That is, that those who have applied, but not been accepted, and particularly those who have not applied appear to reflect a more generally, though more diffusely, favorable attitude than those who have attended.

2. Non-public. The NA Group reported much more favorable response on the part of other teachers in discussing NSF Programs than did the AA Group (almost three-fifths as compared to three-tenths). On the other hand the AA Group was willing to express mixed but positive reactions about twice as often as the NA Group (16%) and about 7% of the NA Group reported that they had no contact with other teachers on this subject. It is interesting also to note that 5% of the AA Group reported a negative reaction and another 5% reported that the work load was heavy in these Institutes. The picture here appears to be approximately the same as in the public senior high schools.

3. Junior Highs. Roughly the same percentage of each group (some 43 to 47%) gave a generally positive response to the reactions of other teachers. However, the AA Group again, as in earlier analyses led in the percentage giving qualified, positive, or mixed reactions (25% vs. 18% for the AR, and 7% for the NA). On the other hand, the NA Group led in negative reactions, (7%) and as might be expected the AA Group led in complaints about work load difficulty, and so forth. It is interesting to note that almost a quarter of the NA Group as compared to none of the AA Group and 6% of the AR Group had admitted not having talked the thing over with other teachers. The NA females were essentially the same as the males, except that a significantly larger proportion of them gave mixed or qualified mixed responses.

4. Summary. In general it would appear that the AA's feel able to be a little more critical of the Programs, with the NA's definitely not giving very much in the way of critical reactions, but expressing a few negative reactions.

In addition, however, a substantial portion of both males and females in the NA Group have never discussed the Programs with other teachers, and thus have no direct comment here. It is interesting to note that Non-applicants could easily have used the excuse that the attitude of other teachers was less than all-out for the Programs, but they did not. Neither did they complain particularly strongly about heavy workloads or other specific difficulties, such as subject matter difficulties.

B-6. "We are interested in reasons why teachers might not apply. What ideas do you have about this?"

1. Senior Highs. The most important general reason advanced by the Non-applicant Group was "other obligations". This was followed by reasons involving low-drive level, by feeling that background was inadequate and by non-relevance. These four reasons came in this same order for both males and females, though there were some differences between the two. "Other obligations" ran strongest with females (56% vs. 48%) for males, whereas low-drive reasons ran strongest with males (31 vs. 21%). About three times as many males as females (16%) gave reasons of non-relevance, and about the same number (about 1/5th) of both males and females offered the reason "inadequate background", or "too high requirements".

In comparisons with the criterion groups, it was the AR Group for the males and the AA Group for the females that stood out in choosing "other obligations" as being of most importance (approximately 3/5ths of the former and 2/3rds for the latter). Substantially more AA males than NA males gave low-drive level reasons, and a vastly larger (more than twice as many) AA females than NA females chose this reason (about 51%). There is no intergroup difference for the males with respect to the non-relevance item (about 16 to 18%) but 6 times as many AA females as NA females (31%) chose this category. With respect to the inadequate background category, more AR males than AA males, and distinctly more of both than of the NA males, chose this category, and slightly more AA females than NA females chose the category (approximately a quarter of the AA females and about not quite a third of the AA males as compared to a fifth of the NA Groups).

In looking at the breakdown of "other obligations" we see that family again was important to the females (35-4[illegible]%), and not so much to males (15-22%). Financial problems were mentioned by the AA females in comparison to the NA Group (12-2), but in the males by the AR Group as compared to the AA Group (14 vs. 8). For both males and females, "other summer job" represents a significant reason, although there appears to be relatively little intergroup differences (11-16% for the females, and 16-21% for the males).

With respect to the low-drive category, both male and female AA Groups felt reasonably strongly that indifference plays a part in non-application. They held these beliefs twice as much as the NA Group. AR's are more like the NA's in this respect.

For the males, about 10% of the AR Group, as compared to 2% of the NA Group and 6% of the AA Group mention the problems involved in the actual application as being an important deterent. With respect to non-relevance it is interesting to note that almost 1/5th of the AA females as compared to none of the NA females talked about "has enough education". This was a relatively infrequently chosen reason for the males. Thus, in summary, the Non-applicants stress family obligations, other jobs, or financial demands, and inadequate background as reasons for non-applications. The Applicant, on the other hand, stresses the same things but with more emphasis on indifference and complacency and more emphasis on inadequate background than supplied by the Non-applicant. The AR Group stressed inadequate background to an even larger degree than the AA Group, mentioned indifference somewhat less, and placed a little more emphasis on family problems than the AA Group. A substantial number of women (about 2 to 1) AA's vs.NA's mentioned the location problem (15%). It would appear that the Preliminary Analysis hit the final situation pretty accurately with respect to this school type.

2. Non-public. Again we see that other obligations come out strongly for the NA Group and also for the AA Group but not quite so strongly (43 vs. 31%). These percentages were made up about equally of family obligations, financial need, and working for a degree certificate. Comments having to do with the low-drive level came out relatively strongly, almost twice as often for the NA Group as the AA Group (28 vs. 15%). Again this tended to be spread over a number of categories but interesting enough it was the NA Group this time that mentioned complacency and indifference somewhat more strongly than the AA Group. On the general category of non-relevance or diminished need, it was the AA's who mentioned this more often than the NA's, not quite two to one (27%). Slightly more of the NA's but almost a third of both groups felt that the background of the teachers may be inadequate or the requirements too high or something of this kind. Again 12½% of the NA Group and none of the AA Group mentioned that application is up to their superiors. In general the interesting finding here is that the AA Group does not appear to see Non-applicants in quite the same low-drive light that the public school applicant did. The emphasis of the NA Group on other obligations appears to be maintained, however, and the importance of inadequate background occurs in this analysis as well as for the public school analysis.

3. Junior Highs. Again, the major general response categories were other obligations and low-drive level reasons. Approximately a little over two-fifths of both NA and AA mentioned other obligations as compared to about 30% of the AR Group. In looking at these in detail, it is seen that between a fourth and a fifth of the AA Group felt that teachers would not apply because of family obligations as compared to less than half that many in the NA Group and virtually none (3%) of the AR Group. On the other hand, there were about 12-13% of the AR and NA Groups who felt that financial reasons would be prominent as compared to only 7.5% of the AA Group, and more than twice as many of the NA Group (17%) felt that teachers could make more money at some other job, or had perhaps permanent summer jobs.

The second major category and perhaps a little more prominent was the low-drive level category where slightly more AA's (52%) as compared to 48% than NA's gave responses of this kind as compared to only 41% of the AR's. In looking at the detailed categories on this, it was the NA Group that felt that complacency is a reason, closely followed by the AA Group and trailed by less than half as many of the AR Group (18 vs. 15 vs. 9). About a fifth of the AA, a quarter of the NA and a third of the AR mentioned reasons having to do with non-relevance of the Programs to the teacher. These reasons were pretty well spread around all groups with the largest number (10-12%) coming to the response that Institutes are not appropriate in content or level. A further large group of responses was observed to the general category the feeling that background was inadequate. A little over 2/5ths of the NA Group as compared to a third of the AR and 30% of the AA gave this response.

4. Summary. Again, the diversity of the findings among the three types of schools makes summarization difficult. The same reasons noted before under B-4b come up again here. For the public senior highs family obligations were important for females and for AR's vs. AA's, while for both sexes in non-public and junior highs the AA's tended to mention this most often. Financial reasons were mentioned less frequently by AA's(except for females) and more by AR's. For public schools the AA's tended to mention low-drive level and indifference (but vice versa for non-public schools). Inadequate background was importantly mentioned as was irrelevance of the Programs (the AA females strongly outnumbered the NA females on "had enough education").

B-7. "In what ways might these Programs, as you now understand them, be modified to fit your particular needs better?"

1. Senior Highs. The availability and location scheduling, convenience, etc. of Institutes seemed to be more important to females generally than to males. Improving communications was mentioned as an improvement particularly by about 16% of the AR males. The emphasis here is on all kinds of improvement of communication, with the AR's particularly emphasizing improved distribution of brochures, etc. This item was mentioned by approximately 6% of the females with no intergroup differences. Application selection procedures particularly concerned the AR and AA males where between a fourth and a fifth mention this problem. The same direction of differences was found also in the females. The specific areas of concern were spread over a number of sub-areas such as "simplify the application procedures", "get more seriously motivated teachers to attend", "increase the availability", or "lower the requirements for acceptance", and others.

The strongest differences and strongest mention was made of the general category of conduct of the Program. We find that 54% of the AA males Group mentioned this category as compared to 39% of the AR's and 28% of the NA males. In the females it was even more strongly mentioned, almost 5 to 1 by the AA Group as compared to the NA Group. Under conduct of the Program, one area of emphasis was on methods and practical application of the knowledge learned. This was considered important by men, more so by the AA Group than by the AR Group and the NA Group (7-15%). However, it was in the females where the AA Group came out strongly for this, with almost 27% of the group mentioning this as a category as compared to only 2% of the NA Group. A topic of concern to the men (15-17%) was adjusting the scope of the level of the work either up or down, usually down, with no group differences. However, again the ladies spoke out more strongly (27% of the AA Group, mentioning this category as compared to only 12.5% of the NA Group). Further, an important category for the ladies of the

AA Group was better organization and planning of Institutes mentioned by 14.5% as compared to none of the NA Group.

Only about 4% of the men and 1 or 2% of the women suggested financial changes. These were about equally divided into stipend increases and travel allowance increases. Again, the analysis follows fairly closely that which was derived for the Preliminary Report.

2. Non-public. In general there was a sharp lack of response to this question in the NA Group as compared to the AA Group. Availability of location was mentioned by 8% of the NA Group and none of the AA Group and this is consistent with the public senior analysis. Improved communications was mentioned by both groups, particularly NA Group in 12 to 17% of the cases. The aspect of this in question was more explicit information in university announcements. Application and selection came in for a considerable amount of comment and possible change particularly with the AA Group. Approximately 38% of this group mentioned something in this category ranging particularly over getting with more homogeneous backgrounds, simplification of application procedure, and such. Naturally the AA Group also had a considerable quantity of suggestions with regard to the operation of the Program (almost 50%). Almost a third of the group mentioned adjustment of the scope or level of the work sometimes up, sometimes down but more of the latter. Only 4% of the NA and 5% of the AA Group mentioned increased emphasis on methodology, however. A number of specific changes were suggested including notably 11% of the AA Group and 4.4% of the NA Group that credit should be guaranteed for Institute attendance. In general the NA's didn't have much to say about changes understandably because of the actual experience with the Programs.

3. Junior Highs. With respect to this question, the NA females and the NA males are very similar. It is also worthy of noting that the NA Group has a vastly larger percentage of omits in this question than either the AA or AR Groups. In spite of this, the NA males mentioned the availability and location problem about 20% as compared to the AA's 12.5% with the AR in between. When we get to the general category of application and selection, however, we find a wide discrepancy among the three groups, AR about 2/5ths, NA less than 10%, and AA more than a quarter. In examining the sub-categories, about 9% of the AR's as compared to virtually none of the other two groups are interested in simplifying the application procedures (this probably reflects their unfavorable application experiences). On the other hand, about 12.5% of the AA's as compared to half that many AR's and virtually no NA's mentioned "get people with more homogeneous backgrounds" (this probably also reflects the experience of the AA Group in attending Institutes). Understandingly enough, about 12% of the AR's as compared to 3% of the NA's and none of the AA's would like to see lower requirements for acceptance and greater availability. It is in conduct of the Program that the greatest percentage of responses occurs, led as might be expected by the AA Group with about 2/3rds, with the AR Group slightly less than half as many, and the NA Group down to 13%. About a quarter of both AR's and AA's would like to see the scope of the

work adjusted, most likely to the lower side, and a fifth of the AA's as compared to only 12% of the AR's, and 5% of the NA's felt that there should be more emphasis on the methodology and practical application. Finally, specific Program changes drew quite a large number, particularly of the AR Group (44%) as versus a fifth of the NA's and about a third of the AA's. The one specific change that was mentioned with regularity (10-18%) was that more Institutes in both location and continuity should be added.

4. Summary. The most frequent suggestions were in respect to the conduct of the Program, covering a large number of miscellaneous ideas. The AA's exceeded the AR's who exceeded the NA's in the aggregate of these suggestions. AA's in the public senior highs, particularly women, stressed the addition of work on method and applications, and the adjustment of the level and scope of the work particularly to make student backgrounds more uniform. Applicants (particularly AR's) were concerned about improving application and selection procedures and communication lines. NA's felt that the location and availability of Programs might be improved. They also omitted the question more often.

C-1. "How does the community around you feel and act toward education and science?"

1. Senior Highs. About a quarter to almost a third of the males, but about a fifth of females, felt that there was a positive attitude in the community and on the part of the parents, and substantiated this by some sort of evidence. About an equal number of males felt that there was a positive attitude in the community and were unable to substantiate it. However, a quarter to two-fifths of the females felt this way. On this particular category, the AA Group tends to be higher than the other groups by a small degree in the males and sharply in the females. For the males there is little difference in indifferent and negative attitudes from group to group. However, for the females approximately 55% of NA's as compared to about a third of the AA's see the environment as either indifferent or as negative to some degree. The difference comes out for females even more clearly in terms of negative attitudes where a full third of the NA Group sees the parents and community as an unfavorable environment as compared to only 15% of the AA Group. With respect to the males not quite a quarter of both the NA and AA Groups see the community as partially negative as compared to only 15% of the AR Group.

In summary, then, there is a sex difference on this question. For the females the NA definitely sees the environment as more hostile than the AA. For the males it would appear that both the NA and AA Groups which are for this question very little different from each other see the environment in approximately the same manner as a third to two-fifths of them seeing it as indifferent or hostile, and the AR Group sees the environment as being a little more favorable with a higher percentage of indifference, but less active negativism on its part. Most of the observations for the Preliminary Report hold fairly well for the female group where it appears that there is a substantially stronger negative attitude in the NA Group than in the AA Group.

2. Non-public. With respect to community attitude, the NA Group tended to believe that the attitude was a little less positive than the AA Group. A considerable larger number of the AA's (32 vs. 18%) expressed a positive attitude with sustaining evidence while about 10% of each group expressed a negative attitude and twice as many of the NA Group saw an indifferent attitude as the AA Group.

3. Junior Highs. Approximately the same percentage of each of the three groups reported positive attitude with substantiating evidence (15-20%). Another 30 to 38% reported positive attitude with no substantiating evidence. It is in the negative category that the group differences emerged with almost 30% of AR's and NA's reporting evidence of some negative attitude as compared to a little more than half as many of the AA's. On the other hand, the AA's and to some extent the NA's are aware of indifference somewhat more strongly.

4. Summary. It seems clear that the NA and to some extent the AR Groups see the attitudes of the parents and community as more indifferent or negative to Science and Education, particularly for the females. The AA's tend to be able to substantiate their beliefs with evidence more frequently than the others.

C-2. "How do your fellow teachers feel and act toward education and science?"

1. Senior Highs. With respect to this question, as noted in the Preliminary Report, there appear to be no systematic differences in the perception of the three groups toward other teachers attitudes toward Education and Science with respect to the males. Here of those who answered the question virtually all expressed a positive attitude, though it must be admitted that an excessive number of "no response" was observed to this question (almost 3/5ths). Approximately 10% negative attitude and not quite 10% indifferent attitude was noticed across the board with little group differences. However, in looking at the females, it may be seen that somewhat fewer omitted the question, and that Non-applicants are characterized by having a somewhat larger percentage of positive attitudes than the AA Group -- about 30% vs. 25%, a distinctly (12% to 1%) larger group of indifferent attitudes and it is most interesting to note that almost 35% of the AA Group considered the attitudes of their colleagues to be negative as compared to only 10% of the NA Group.

Just why the AA female teachers should find themselves in such lack of accord with their colleagues is not clear. Certainly the figures for the NA females tend to go along very much the same way as the Preliminary Analysis findings and as the AR, NA and AA Groups for males. But to find over a third of the AA females feeling that their colleagues have a negative attitude is somewhat surprising. Further thought should be given to an explanation of this unusual fact. The lack of a middle ground in these statistics is also interesting. That is, a quarter feel positive, virtually no one feels indifferent, and over a third feel negative with respect to other teachers.

2. Non-public. With respect to the teacher and peer attitudes, over 2/5ths of the AA Group as compared to 1/4th of the NA Group expressed positive attitudes while 16% of the NA as compared to 5% of the AA expressed indifferent or negative attitudes.

3. Junior Highs. There is little difference with respect to attitudes of peers with the AA Group seeing the situation as slightly more positive (28% vs. 23% vs. 18% for AA, NA, and AR, respectively). Approximately a fifth of each group sees the other teachers as either indifferent or somewhat negative. Teacher attitude is about half as much distinct positive evidence and almost twice as much distinct negative feeling on the part of the NA females as compared to the NA males. As may be traditional, females don't get along together quite as well as the males do.

4. Summary. The NA's appear to work in a less positive peer atmosphere except for females in the public senior high schools, where the AA's see their colleagues as more negative. Females report greater negative feelings, particularly in the public senior high schools.

C-3. "How does your student body feel and act toward Education and Science?"

1. Senior Highs. Findings with respect to this question parallel very nicely those reported in the Preliminary Report. There appears to be a distinct tendency on the part of both male and female teachers for the Non-applicants to perceive their students' attitudes as being less positive than is true of either the AA's or AR's. This tendency is much more clearly marked with respect to the female teachers, however, where some 42% of the NA's as compared to 29% of the AA's noted a neutral to negative attitude on the part of their students. Corresponding figures for the males were 33% for the NA's as compared to 28% for the AA's and 23% for the AR's.

2. Non-public. Again, with respect to student attitudes, about 2/5ths of the NA Group as compared to only 15% of the AA Group noted that their students had a neutral to negative attitude.

3. Junior Highs. With respect to the attitudes of the students, it is clear that approximately the same percentage feel a positive attitude, but due to difference in percentage of omits, it is clear that about 2/5ths of the AR and NA Groups feel a neutral to negative attitude as compared to only 1/5th of the AA. However, about 42% of female AA's as compared to 29% of female NA's feel this way.

4. Summary. Again the NA's tend to see their student's attitudes as less favorable.

VI. Summary and Discussion of Target Group Findings

There are, of course, many ways that the analyses of these data might have been organized. Among the alternatives were to analyze each criterion group separately compared to a composite of all three groups--in other words, to the over-all teacher population; to analyze the criterion groups separately by types of school; to analyze the criterion groups compared to each other separately by types of school; or to analyze the criterion groups comparatively over all types of schools. There are perhaps additional alternatives. It was decided that the most sensitive procedure would be to compare the criterion groups directly to each other, with emphasis on the comparison of Applicant-Acceptees to Non-applicants in order to maximize the detectability of differences. Comparing each of the criterion groups to a composite made up of teachers over-all would have weakened the ability to detect differences between the groups individually.

In Part One of this chapter summary descriptions of the population are presented, taking over-all school types combined. The rationale for combining the school types is that the effort in this chapter has been primarily to discover characteristics and attributes of the Non-applicant population which are sufficiently strong to carry through the different types of school situations. It was felt that the emphasis of the present study has been upon the Non-applicant population as a population rather than on the comparison of school types. Of course, some differences do exist between school types and also between sexes. Because of this, a separate section is included in this chapter which briefly points out some of the more outstanding differences on these two variables. However, the major effort in this chapter has been to take a look at the Non-applicant population as a group over all school types.

As some of the results were based on correlational analyses, it should be pointed out that the only way to approach the correlational analyses was to divide the population into Applicants vs. Non-applicants. There were two consequences of this division of the teacher group into a dichotomy. The percentage split of Applicants vs. Non-applicants was evened up to some extent by this process since the AR's and the AA's were pooled together in their half of the dichotomy. On the other hand, it was noted several times in the Preliminary Report that in some cases, particularly for academic background and training variables, the AR's looked more like the NA's than like the AA's. In such cases, it should be noted that the treatment of Applicant teachers as a single group (AR's and AA's together) might very well have concealed some of the relationships that would be evident in comparing AA's strictly to NA's. As mentioned earlier, however, it was felt that it was necessary to include this variable in the correlational analyses, it being the criterion variable, and since the correlational techniques required a dichotomy, one was used.

Part Two discusses some of the findings, and Part Three presents a psychological conception of the Non-applicant.

Part One - Summary of Group Comparisons

NA - AA Comparisons

In the following section the important aspects of non-application for the Target Group population are summarized. It must be remembered that this population is one which is reduced in range on both age and percentage of time teaching Math and Science. The age range is from 25 through 55, and no one is included who is teaching Math and Science less than 40% time.

Again, the material below, organized by areas of interest, represents the trends discerned in the data, and cannot be thought of as being true for each individual, or even for each small group. In general, the findings reported below represent the summarization of the trends noted across the various groups, and relatively little effort has been made to distinguish inter-school types of differences.

Background

Just who is the Non-applicant? The chances are better than even that he is a public senior high school teacher, about one out of three that he is a junior high teacher, and about one out of ten that he is a non-public school teacher. (These figures result since, while more than half of the non-public and junior high school teachers are Non-applicants, as compared to less than two-fifths of the public senior high teachers, the total number of public senior high school teachers is much larger.) The Non-applicant is more likely to be a woman, teaching in a small (grades 7-12 or K-12) school, located in a rural or small town area, and serving a comparatively low cost housing area. No relationship was observed between application and such common variables as percentage of parents belonging to PTA, father's income, etc. However, there is likely to be a public library available to the school, and there is some tendency for the parents in the community to be of the professional, clerical, rather than the farming class. The teacher is likely to be married (but no more likely than Applicant teachers), and is no more likely to have dependents than are Applicant teachers. The Non-applicant teacher is likely to regard the environment surrounding him as being comparatively less favorably inclined toward education and Science in particular, both on the part of the parents and the community in general and on the part of his colleagues and the student body.

Educational Background

As compared to the AA's, the Non-applicants are characterized by a smaller total number of graduate hours and by fewer Math and Science majors both at the graduate and the undergraduate levels. While the AR Group appears to be education-oriented rather than Math/Science-oriented, as indicated by its high proportion of Education majors, the Non-applicant Group has a relatively larger percentage of its majors outside of the areas of Science, Math or

Education. Schools characterized by large numbers of Applicant teachers tend to have teachers of higher than average training in Science and higher average total number of hours of graduate work.

Work Situation

There are few relationships between the characteristics of the principal and non-application. There is some suggestion that principals with fewer number of hours in Science and Math tend to be principals where there are more Non-applicant teachers. The Non-applicant teacher tends to work in a school where course offerings in Science and Math are generally less extensive than in Applicant schools, and where there is less inclination toward experimentation in Science and Math offerings and toward homogeneous grouping. In addition, student quality seems to be less good as indicated by fewer numbers of National Merit Scholarship letters of commendation and semi-finalist winners.

Non-applicant senior and junior high school principals tend to feel that their teachers' salaries are better than those in comparable surrounding communities (the reverse is true for non-public schools). However, direct salary data suggest that it is the Applicants who are the higher paid teachers, probably because higher paid teachers apply.

Although data in the Preliminary Analysis suggested that the Non-applicant was more content salary-wise than the Applicant, there now appears to be little difference between the two on this point. It is the AR Group who are comparatively less content.

Strong recommendation by the principal was powerfully related to application, particularly for the non-public schools. While most principals reported recommending application, very few teachers report applying as a function of the principal's or supervisor's recommendation. The conflict in these data tends to suggest that the recommendations of principals and supervisors are not made as consistently or as strongly as these principals and supervisors would lead us to believe.

About 80 or 90 per cent of the teachers seem to have at least partial information or familiarity with NSF Programs. As might be expected, Applicants (even AR's) tend to exceed the NA Group in familiarity. Non-applicant teachers tend to depend comparatively more on other teachers as a source of information about NSF Programs, while the AA Group depends comparatively more on NSF literature, professional journals and principals' recommendations.

The Non-applicant teacher tends to teach Science and Math courses a smaller percentage of his time than do Applicant teachers. There is no relationship with number of years of teaching experience, however. In relationship to tenure available, the Non-applicants have been placed on tenure less often and have certification deficiencies more often. They tend to have less extracurricular supervision responsibilities in Math and Science areas in particular, if not in general. Somewhat fewer Non-applicant teachers tend to want to remain in Math and Science and/or secondary teaching as compared to Applicants.

Teacher in general, including Non-applicants, apparently enter teaching primarily because of their interest in teaching and in working with children, rather than their interest in subject matter areas. (Only about 3-13% of males and 15-23% of females noted that interest in the subject matter area was the reason for their entry into teaching.) As many as three-quarters or more of teachers have entered teaching either as a second or later vocational choice, fortuitously, because of convenience, or as a corollary of other jobs. This tends to be less true of Non-applicant teachers in the public schools, but more true of them in the non-public schools. Similarly, the Non-applicant teacher is less likely to have considered another occupation to the point of beginning preparation (if he is a public school teacher).

Activities

The Non-applicant teacher is more likely to want his summer to himself and not to take a job, attend summer school, or take up some other organized summer activity than is true of the other two groups. The AR Group, on the other hand, shows the most drive in holding down many of the activities and jobs, but is less education involved, holding jobs less often in education-related areas. The Non-applicant is likely to be intermediate between the AA and the AR teachers in this latter respect. However, the major activity of the AA teacher during the summer is attending summer school, thus underlining a strong self-improvement drive as compared to the Non-applicants, while the major activity of AR teachers is holding a non-school job.

Attitude toward Work

As indicated before, the Non-applicant is somewhat less likely to indicate that he will be teaching Math or Science five or ten years from now, as compared to the AA Group. However, most of all three criterion groups intend to stay in education and in Math/Science teaching. There is a somewhat stronger tendency for the Non-applicant to be undecided about his educational future, or to be planning on a transfer into administration, whereas there is some tendency for Applicants to want to go into college teaching. In general, most teachers feel that accomplishing their vocational goals is best done by furthering their education in terms of advanced courses and degrees, etc., rather than by taking workshops or attending Institutes.

One of the most significant differences between the AA's and the NA's is that the AA's recognize more strongly the need for keeping up with developments in the field, not only in general, but by specific action such as taking workshops, Institutes, advanced training, etc. The AR's are interesting in that they see the need to keep up, but find it difficult to find the time to do so. Comparatively speaking, the AA's are distinguished by their feeling that they can keep up partially through their professional activities (except in junior highs), while Non-applicants, women, and non-public school teachers all see reading as the prime way to keep up with developments.

Comparatively speaking, the Non-applicant teacher finds his satisfactions in teaching more in his own personal growth and satisfaction and in his working with children. The AA's find their satisfactions more in the contributions that they feel they make to society (particularly in non-public schools), and in satisfactions growing out of their associations with their professional associates. Of course, satisfactions growing out of the relationships between students and teachers are far and away the most often mentioned likes about teaching, underlining the importance of the observation that the most important job characteristic of teaching at the secondary level is the inter-action with students, rather than the inter-action with subject matter. This is true of all groups. However, it is questionable as to whether or not the student related satisfactions have quite the same meaning for the Applicants as for the Non-applicants. There is some hint that students are seen as the focus of subject matter activities to a greater degree for the Applicants, while they are seen more as the focus for inter-personal relationships and personal growth and satisfaction for the Non-applicants.

With respect to dislikes about teaching, the Non-applicant, particularly in the non-public school, dislikes grading. On the other hand, AA's don't mind grading so much but particularly dislike the record keeping and clerical chores associated with teaching. All groups have as their major dislikes working conditions (including long hours, limited facilities, low salary, etc.) and paper work (including grading, record keeping, etc.). Particularly in the non-public schools, the Non-applicant teacher is likely to have more problems, comparatively, with adults outside the school (mostly with parents) and with student relationships as well. (The reverse is true in junior highs.) The Non-applicant teacher is likely to feel that limited physical facilities, overcrowding, etc., are big disadvantages. Non-applicant females are also likely to have more student related problems, such as motivation and discipline problems than males, somewhat more than Applicants.

Another factor which seems to distinguish fairly sharply between Applicants and Non-applicants is the relative lack of subject matter professionalism on the part of the Non-applicant teacher. Professional orientation in terms of belonging to professional organizations, particularly Math/Science organizations, reading professional journals, particularly Math/Science journals, to some extent outside professional activity and office holding are a characteristic substantially more of the Applicant teacher than the NA teacher. The evidence suggests that this is more true in the senior high schools than in the junior high schools.

Self-Concepts

One of the most distinguishing features between the AA's and the NA's was the AA's feeling that they are better prepared in subject matter. This was mentioned most often by the AA's. On the other hand, the NA teacher tends to emphasize patience, understanding, and especially his personal interest in the students as his strong points. The AR teachers also emphasize understanding and ability to get students to do the work. With the exception of public senior highs, the Non-applicant is distinguished by mentioning discipline as a strong point less often than the AA teacher, though he tends to feel he is better able to put his points across. The male AA's emphasize their teaching methodology as a great strong point, while the female NA's exceed the AA's on this. In the non-public schools this is the major strong point mentioned by NA's.

With respect to weak points as a teacher, the Non-applicant teacher admits to subject matter deficiencies, especially in the non-public high schools. He is also likely to feel that he is somewhat too easy going on his students. The AA teacher, on the other hand, may feel that he expects too much of his students, and feels some lack of ability to adjust to group differences.

Receipt of NSF Materials

The distribution of NSF literature tends to be better in school characterized by having a larger number of Applicant teachers, better in 1961 than in previous years, and better in the public than the non-public schools. There is little doubt that some degree of non-application is accounted for by communication failures in the distribution of this literature, particularly to non-public and junior high schools, in past years. In public schools notices are the prevalent source of information, followed by direct inquiry, while the reverse is true in the non-public schools. The Non-applicant schools tend to list less direct sources of information. Applicants tend to list professional magazines more often than Non-applicants, and professional magazines show up significantly less in junior high schools as a source, confirming the impression of lack of professionalism in this area. There are relatively few differences in the treatment of NSF literature, but Non-applicant schools and non-public schools appear to treat NSF materials somewhat less definitively than do Applicant and public schools.

Attitudes toward Application for NSF Programs

With respect to the purposes of NSF Institutes, the NA Group sees broadening as a purpose and up-dating as a purpose less often than the AA teachers, particularly up-dating (with the exception of the non-public schools). As compared to the NA's, the AA's emphasize the improvement of teaching techniques as a purpose. This latter is particularly true of females, males being relatively more concerned about the broadening and up-dating purposes. The purposes as seen by school principals tended to be the same. However, Non-applicant school principals mentioned that they saw no benefits in the Program for their teachers more frequently than did Applicant principals. On the other hand, Applicant principals tended to mention increased enthusiasm and interest on the part of the teachers more often.

1. Why Apply? The AA Group mentioned self-improvement reasons, emphasizing up-dating and broadening along with improved methodology. This was followed by financial assistance. Although reasons given by the Applicant Groups do not take the specific form of professional or financial advancement in their regular jobs (0-8%), this motive undoubtedly exists to some extent. In any case, financial benefits of the summer's work or the stipend were mentioned as an asset and the reason for application, particularly by public senior high men. This may be the greatest amount of money that these people earn over a similar period of time. In general, men emphasized the financial benefits and subject matter competence reasons to a greater degree than women.

2. Why did you not apply? In general, Non-applicants reported reasons of other obligations of one kind or another as the main reasons that they did not apply. Other obligations included family obligations, (mentioned much more frequently by women) and financial obligations including having another job, having a permanent summer job, able to make more money elsewhere, and so forth (mentioned much more frequently by men). Other reasons mentioned included other time demands, irrelevancy of Programs, poor location of Programs, and lack of background. The men tended to mention inadequate background more than the women, while the women mentioned irrelevancy in the form of "have enough education" more often than the men.

3. Why would other teachers not apply? The NA teachers tended to mention reasons which were categorized under low drive, including indifference and complacency less frequently than the AA's (except for the non-public schools). Senior high AA's mentioned lack of background. The AA's also mentioned family obligations for females, except for the senior highs. Female AA's mentioned non-relevance and having enough education more frequently, and the males mentioned low drive reasons more frequently as compared to NA's. Other reasons mentioned were similar to those mentioned above. NA's were generally less critical than AA's.

4. School Comments. NSF Programs are not seen as effective methods of getting salary increases, particularly by Non-applicant schools. Further, principals estimated that family responsibilities would be a main reason for non-application. However, Non-applicant schools mentioned other commitments and obligations more frequently than Applicant schools. Applicants felt much more frequently that Non-applicants would be complacent and satisfied with their own educational level, while Non-applicants stressed red tape involved in application.

Possible Program Modifications

The AA teachers emphasized the need for more work on methods and techniques (but not in the non-public high schools). This was also emphasized more by females than males. AR's emphasized the improvement of application and selection procedures, including the lowering of certain requirements. The NA teachers, on the other hand, seemed more concerned with better locations and availability of Programs. The AA Group also suggested adjusting the level of Programs so they would be more appropriate and homogeneous for the groups taking it. Females were also more concerned with location and convenience of Programs than males, particularly for the Non-applicant teachers.

The AR Group

Some observations about the AR Group require comment. The data suggest that this group is a somewhat lower ability but an equally high drive group as compared to the AA's. They hold the most extra and summer jobs (but not necessarily related to their training), apply for Institutes, etc., and supervise all kinds of extracurriculars. They are much more often Education majors rather than Math/Science or other field majors. Comparatively few entered teaching because of subject matter interest.

The prime concern of the AR Group seems to be money. They are more concerned about the financial problems and benefits associated with attendance at NSF Programs. They complain more about the low salaries in teaching. It might be hypothesized that much of their job activity grows out of this concern. They recognize the need for keeping up with the field, but tend to have done nothing about it, rationalizing this as a lack of time (more of this group complained about problems in budgeting their time). In mentioning their strong points, the AR's make relatively greater mention of such vague things as "understanding students". They applied more for broadening than up-dating as compared to the AA's, suggesting a less penetrating insight into their subject matter deficiencies. Trouble spots were in miscellaneous personal shortcomings and discipline problems. As might be expected, they felt the application and selection procedures might be improved.

Thus, it would seem that the main motivation for application by the AR Group may be financial gain rather than self-improvement as found for the AA Group.

Male - Female Comparisons

Females form a significant portion of the Non-applicant Group, ranging from a little over a quarter in the public senior highs through a little over a third in the junior highs up to almost half in the non-public schools. This being the case, it was felt to be worthwhile to devote some space to a brief comparison of the outstanding or salient differences between males and females, particularly as found in the interview analysis. Not all the points noted below have a bearing on non-application, but in considering the institution of modifications of Programs or new Programs, it is necessary to consider the appeal of such modifications and new Programs to the sexes involved. To this end, comment on the differences between males and females may help in decisions as to the feasibility of proposed Programs or Program changes.

Female teachers are characterized, compared to males, by a larger percentage who have an early desire to enter teaching, and who have never considered any other occupation than teaching. However, they tend more to enter because of subject matter interest, particularly in the public schools. This suggests that teaching is an acceptable vocational outlet for interests which might otherwise lead to a predominantly male vocational field such as engineering. On the other hand, males are more often likely to start their vocational careers in another field. Females are more likely to describe teaching as non-boring and as having variety, and as making a contribution to society, particularly Non-applicant females. On the other hand, males tend to emphasize the imparting of knowledge as being a like in teaching.

With respect to dislikes in teaching, females object to paper work more than males, both to record keeping and to grading activities. On the other hand, males are more dissatisfied salary-wise, particularly in the public schools. Females tend to have as weak points discipline and student motivation problems, particularly Non-applicant females, while males tend to have more problems with outside persons such as parents and the community, etc.

Females stress patience, understanding and personal interest and, particularly the AA females, their good personal relationships with students as strong points. Males, on the other hand, are much more interested in subject matter and subject matter strengths are their best points. Males also mention subject matter deficiencies as personal weak points to a greater degree than females.

With respect to satisfaction in their present position, females in the AA Group are more satisfied with their present positions than females in the NA Group. In addition, females in general differ from males in preferring reading as the primary avenue to keeping up with the subject matter as compared to attendance at Institutes or taking courses. In discussing the purposes of NSF Programs, men mention broadening and up-dating in subject matter more predominantly than do women. On the other hand, women, particularly AA's, mention improvement of teaching techniques as a purpose than do men. In addition, men emphasize the financial benefits of attendance at Institutes, particularly the AA's, and also increased subject matter competence as a desirable outcome to a greater degree than women.

In discussing reasons why they do not apply to Institutes, more than half of the females (54%) mention family obligations as the reason why they do not apply. This is a much greater percentage than is true of the men, who are comparatively more concerned with financial obligations. Men also tend to mention inadequate background more than do women. In discussing why other teachers might not apply, men tend to mention low drive level types of reasons more than women, but females mention non-relevance three times as often as men, other obligations more often than men, and state (particularly for the AA's) that they have had enough education more often than do men.

Men find it possible to be more critical of the Programs. However, females tend to emphasize Program changes more often than males do, particularly with respect to more emphasis on methods and techniques, better location, schedules, and more convenience. Finally, women tend to see the community as more negative toward education and Science, particularly for the NA's, while women see their colleagues as less favorably inclined toward Science and education as compared to men, particularly for the AA's.

In summary, it can be seen that women came into teaching with more of an early desire, less critically, and have considered teaching to be a more stimulating occupation for them than other occupations open to them. They tend to be less concerned with the subject matter aspects and more concerned with their inter-personal relationships with students, and the use of patience, understanding, good relationships, and to be more put out with routine tasks such as paper work and grading, etc. They have not applied for Institutes primarily because of lack of direct subject matter interest, but also because they feel strongly that they have obligations to their families. They see NSF Programs as being less relevant to their needs than do men, and they see the community and their colleagues as somewhat less favorable toward education and Science than men do.

On the other hand, men tend to be concerned with the subject matter, both in competences and deficiencies, and to be concerned with financial problems, and to a slight extent problems with outside persons. They tended to start in another field more often and to find satisfaction in the imparting of knowledge and to be more concerned with broadening and up-dating their subject matter competence. Benefits of the Program are seen as financial and subject matter competence, and difficulties are seen as financial, inadequate subject matter background, etc.

Inter-School Comparisons

While the comparison of school types was not seen as a major purpose of the analyses, a number of cases arose where what seemed to be important trends in the data were contradictory in one or more of the various school types. Thus it seems worthwhile to take a small amount of space to comment on these contradictions. It will be seen that in most cases the differences appear to be in the divergence of the non-public schools from the public schools. However, there are some cases where public senior highs and non-public highs agree, and junior highs seem to be the divergent ones.

In general, the thing that seems to distinguish the non-public schools from the public schools in terms of discriminating between Applicants and Non-applicants is the particular importance in the non-public schools of professional orientation as the big difference between Applicants and Non-applicants, whereas level of training seems to be a more powerful factor in the public schools. There appears to be comparatively stronger (earlier) focus on teaching as an occupation in the non-public schools. Starting in another field or considering another occupation to the point of beginning it is related to non-application in the non-public schools, but is related to application in the public schools. On the other hand, while Applicants emphasize keeping up more than Non-applicants for both public and non-public schools, the non-public schools place more emphasis on reading as a method as compared to education in the public schools. In fact more non-public school AA's report learning about NSF Programs from professional journals than public school AA's. In the non-public schools being content with present position in Math/Science teaching is related to being a Non-applicant, whereas it is related to being an Applicant in public and junior high schools. Further concern about subject matter aspects is indicated in the fact that while all three types of schools indicate that subject matter weaknesses are associated with Non-applicants, this is much more true for the non-public schools than for the public schools. However, although up-dating and improved teaching methodology are seen as purposes of NSF Programs more often by Applicants in the public schools, neither of these is related to application in the non-public schools.

The importance of the superior to the non-public schools is indicated by the fact that only in the non-public schools is application related to the greater training in Math and Science of the principal, and only in non-public schools is the recommendation of a superior reported significantly often by the teachers as a reason that they applied. Further evidence of their emphasis on subject matter is seen by the fact that the Applicants in the non-public schools significantly more often mention needed improvements as additional degree and sequential Programs. Teaching methods were mentioned as a strong point more often for Non-applicants in the non-public schools as compared to more often for Applicants in the junior high schools.

The sex of a teacher is related to application, females being less likely to apply in the public schools, but there is no such relationship in the non-public schools. However, the married teacher in the non-public school is less likely to apply, whereas there is no relationship on this point in the public schools. It had been expected that teachers who got the highest grades in their undergraduate training would tend to be Applicants, but this turns out to be true only for the non-public schools. On the other hand, fewer of the non-public school teachers belong to NEA and its related organizations than for public school teachers. More homogeneous grouping in Science and Math tends to be a characteristic of the Applicant public schools, but not the Applicant non-public schools. However, the presence of Science supervisors in the school system tends to be related to Applicant non-public schools but not to Applicant public schools. Community influences seem to be somewhat smaller as professional or clerical occupations of fathers is associated with Applicant schools for the public but not the non-public schools.

Non-public schools tend to have received NSF literature less frequently than public schools. They reveal a significant dislike for grading, particularly for the Non-applicants. While public schools tend to consider working conditions the biggest disadvantage in teaching, followed by paper work, the reverse is true for non-public schools. With regard to reasons for non-application, Applicants exceeded NA's in the public schools in considering low drive as a major reason for non-application, however again the reverse is true in the non-public schools.

Junior high schools tend to be distinguished from the others on several points. While Applicant schools tend to be larger for the senior high schools, there is no relationship for the junior high schools. Again, public senior high schools which are Applicants tend to have larger class sizes, but the reverse is true for junior high schools. The junior high schools are the only school type for which the Applicants significantly mention teaching methodology as a benefit of attendance. While Non-applicants in the senior high schools tended to stress student related problems as some of their teaching dislikes, it was the Applicants in the junior high schools who stressed this type of problem. As noted in other places, one of the distinguishing features of the junior high school appeared to be its relative lack of professionalism on the part of the teachers.

Part Two - Discussion

In the following section some of the points presented in the previous summary descriptions are briefly discussed.

Background

It was noted that more than half of non-public and junior high school teachers are Non-applicants as compared to less than two-fifths of public senior high teachers. There are probably several reasons for this finding. Non-public school teachers have not received the literature quite as much as public school teachers, and this probably accounts to some extent for their relatively low application figures. Another possible reason for the relatively low application figures in the non-public schools is that a large proportion of non-public school teachers are in parochial schools, and thus are to some extent dependent upon the recommendations and decisions of their superiors as to whether or not they should apply for Institutes. The relatively low application rate in the junior high school group is probably at least partially a function of the level of subject matter dealt with by these teachers, which leads to the idea that they are perhaps less well identified with the subject matter field, comparatively, than senior high school teachers.

It was noted that the Non-applicant was more likely to be a woman. This probably results because of women's natural tendencies to feel that their place is at home with the family, rather than out at Institutes. Also, many are married and may consider their jobs as secondary to those of their husbands. This is borne out to some extent by the concern of women for family responsibilities in their response to the question about why they did not apply. The interview data also tends to suggest that women in general tend to fix on teaching as an early vocational choice and that they tend to be less vocationally adventuresome than men. They are likely to be teachers rather than subject matter specialists, and not to be particularly interested in subject matter improvement or advancement. They may feel that advancement does not matter very much, particularly if their husbands are working.

Since neither Applicants nor Non-applicants apparently have more of a problem in support of dependents than the others, it would seem that neither do dependents hinder the Non-applicants from applying, nor do they seem to provide a motivating factor resulting in increased achievement motivation for the AA Group.

The concentration of Non-applicants in small, full-grade-range schools in rural or small town areas, tends to go along with the problems of disseminating information to such schools, and also with the traditional small town attitude of complacency and narrow conservatism. It must be emphasized that the grade range does not appear to be particularly important to start with, nor does low cost housing area, since small high schools tend to be located in rural areas which tend to be low cost housing areas, and small schools in general tend to have a full range in grades in their schools. In other words, we may be dealing with what might be described as a small school, small town syndrome here, with all of the well known sociological concommitants of such a situation.

Two implications of this situation should be noted. First, the distribution of the teaching load in small schools would usually prohibit having any teacher full-time in Math/Science. The net result would likely be a less firm identification with the subject matter field. Secondly, evidence external to the study shows that while good teachers often start in the smaller, more rural schools there is a high level of migration among these teachers to the larger schools and better paying jobs in more populated areas. The use of the age restriction in defining the Target Group has controlled this factor to a great degree, and the teachers in the Target Group are probably not greatly subject to migration.

It was noted in the Preliminary Report that the very young teachers and the very old teachers tended not to be Applicants--the young for various reasons, particularly the recency of their training, and their marginal financial stability; and the older teachers because of their nearness to retirement and the unlikelihood of their being selected by Institute directors. Since these groups were pruned out of the Target Group, it can now be noticed that there is no relationship between age and application. This is substantiating evidence that the original hypothesis that these extreme groups of teachers would be Non-applicants was true, for this is the most likely way the previously found relationship between age and Non-application could have disappeared from the present analysis.

The lack of relationship between application and such variables as percentage of parents belonging to PTA, father's income, etc., is interesting and suggests that the influence of the community on application is rather indirect. Some tendency was noted for Applicant schools to be located in communities where there were higher percentages of professional and clerical, rather than farming class parents. Since we are talking to a large degree about small town schools, these would identify towns in which there is a good percentage of other than farming, that is, small business, and so forth, and perhaps a more progressive attitude. The finding that the Non-applicant teacher is likely to regard the community surrounding him as being comparatively less favorably inclined toward education and Science in particular is probably a reflection of actual fact as well as a projection of his own feelings and perceptions. That is, the communities in which there are smaller proportions of professional and clerical people probably are, in fact, less favorably disposed toward education and Science, and this predisposition is probably carried through to the teacher's colleagues and to the student body. In addition, however, these teachers' own lacks may provoke a negative attitude in others, particularly students.

One of the more interesting findings seems to be that there is no relationship between marital status and application. Of course, it may be that the Non-applicant teachers take their family responsibilities more seriously than the Applicant teachers, but this hardly seems too likely. Thus it seems that the Non-applicant teacher may to some degree take refuge behind family responsibilities as a justification of his lack of interest in NSF Programs.

Educational Background

The fairly consistent finding that the Applicant-Acceptees tend to have not only a larger number of hours in specific Math and Science subjects, but a larger total number of graduate hours, suggests that the AA Group as compared to the NA Group is considerably more oriented toward further education as well as toward Math and Science. (Of course this may be partially the result of attendance at NSF Programs and partially the result of Program selection procedures.) The AA Group also has considerably greater Math and Science majors both on the graduate and undergraduate levels. The implications of these findings are twofold. First, they suggest that it will be the AA Group, or the Applicants in general, since the AR Group is somewhat similar on this point, who will be most interested in anything of the nature of further education. Second, the specific orientation of the NA Group toward Math and Science is obviously weaker than that of the AA Group, and thus they are likely to be somewhat less interested in further education specifically in the area of Math and Science.

It had been hypothesized that one reason that teachers might not apply for NSF Programs would be that it would interfere with a planned program toward some particular degree at an institution. However, there is no significant relationship between currently working on a degree and criterion group. However, the present analysis is based on correlational data, for which the AA and AR Groups are in effect pooled. Thus it appears likely that the advantage of the AA Group over both the NA and AR Groups is somewhat cancelled out by the combination of the AR and AA Groups into Applicants for correlational purposes. Therefore, the relationship which had been found in the Preliminary Analysis where the AA's reported significantly more teachers working toward a degree probably still holds.

The suggestion in the Preliminary Report that the AA Group is comparatively a more able group than the NA Group does not appear to hold up in the final analysis, there being no significant differences in undergraduate grades. However, it still appears likely that there is a difference between these two groups in ability in favor of the AA Group. It will be remembered that in the Preliminary Report, with the exception of Biology, it was found that the AA Group had substantially higher percentages of the group reporting a grade B or better in each of the Mathematics and Science subjects. On the other hand, the AR and NA Groups were approximately equivalent in respect to this statistic. In addition, the AA's have often attended better schools and have taken more difficult courses. Finally, again the combination of AR's and NA's for correlational purposes probably nullified the advantage of the AA's over the AR's and NA's. Therefore, it is probably true that the AA Group represents a superior group in ability, and if it could be looked at separately as compared to the NA Group would significantly exceed the NA Group in undergraduate grades.

An important interpretation of the fact is that should the NA Group apply for Institutes, to the extent that selection is based upon undergraduate grades, they very well might be rejected as were the AR teachers.

Work Situation

The finding that there were few relationships between principals' characteristics and non-application is one which is interesting. There was some slight suggestion that principals with fewer number of hours in Science and Math seemed to be principals where there are more Non-applicant teachers. However, in general the principal appears to operate with respect to his attitudes toward NSF Programs pretty much in a manner which he feels is most appropriate, rather than one which is predetermined by characteristics such as his own age and training. On the other hand, however, it is also worthy of mention that the Non-applicant teacher tends to work in a school where course offerings in Science and Math are generally less extensive, where there is less curricular experimentation in Science and Math, and relatively less homogeneous grouping. This would tend to suggest that the Non-applicant comes from a school environment where there is significantly less emphasis on Science and Math in general, thus leading to the conclusion that he is, at least to some extent, a product of his environment in this respect. In addition, some evidence that student quality is not as good (in terms of numbers of National Merit Scholarship awardees, etc.) suggests that the student receptivity for Science and Math probably isn't quite as good in these schools. Again, however, it should be remembered that these characteristics are associated to some extent with the types of schools in which the Non-applicant tends to work--the small, rural, low cost area types of schools. The general implication of these findings is that the Non-applicant appears to work in a general milieu somewhat less favorable to Science and Math. This factor will be difficult to combat.

It had been hypothesized that there might be a feeling on the part of Non-applicant school principals that low salary schedules might present some disadvantage in their attempts to gain good teachers. It is very interesting to note that, at least for the public schools, Non-applicant principals tend to feel that they are better off with respect to teachers' salaries as compared to surrounding communities. However, direct salary data from the teachers shows the reverse relationship, i.e., that the Non-applicants are the more poorly paid teachers, which may again be partially a function of the smaller, more rural character of Non-applicant schools where pay scales are lower. This finding suggests that there may be a sort of school atmosphere of complacency prevalent in Non-applicant schools. Of course, the evidence also suggests that it may not be attendance at NSF Programs which results in higher pay, but that perhaps higher paid teachers apply. All principals rank attendance at NSF Institutes quite low as a factor in teachers' salary increases, so that even if a Non-applicant school principal did feel that his teachers were less well paid, he would not be likely to recommend NSF Programs as a procedure for the teacher to better his salary.

If it were possible to encourage school systems to give credit for NSF Programs in weighing salary increases, the relatively poor competitive position of attendance at these Programs would be enhanced.

One of the most interesting findings in the entire study, in the opinion of the staff, is the finding that principal's or superior's recommendation is an extremely important factor in application. There are contradictions in the data on this point, however. In the first place, principals report in a very high proportion of cases that they recommend attendance at NSF Programs. There is a sharp difference, however, between Applicant and Non-applicant schools in the percentage of those who strongly recommend attendance. This finding underscores the importance of the principal's influence. However, the interview data, in response to the question, "Why did you apply?", shows a very small percentage of the Applicants who attributed their application to superior's recommendation. There are two important aspects of this contradiction. The first is that many principals who say they recommend attendance at NSF Institutes probably do not do so with any strong degree of emphasis. Secondly, of course, many Applicant teachers may not be aware of the extent to which the principal's recommendation affected their application behavior. The upshot of these findings is that the recommendation of superiors, such as principals, is a strong factor but could probably be made more so if it were possible for NSF to "sell" its Programs to more principals.

One of the most important findings of the study seems to be that most of the teachers in Math/Science are teachers primarily for the sake of teaching rather than for the sake of interaction with the subject matter. There is some suggestion that the Applicant teachers tend to be more focused in their interaction with students--that is, to have more concern for subject matter, using their interactions with students as a vehicle, but there seems to be no doubt that the primary dynamic in the case of all teachers is the interaction with students in the classroom situation. It is very interesting to note, however, that the large majority of all teachers have entered teaching either as a second or later vocational choice, fortuitously, because of convenience, or as a corollary of some other job. This tends to be less true of the Non-applicants (at least in the public schools) than of the Applicant teachers. Similarly, in the public schools, the Non-applicant teacher is less likely to have considered another occupation to the point of beginning his preparation. This would tend to suggest that, as compared to the Applicant teachers, the Non-applicant teachers are more focused on teaching itself, less venturesome and somewhat less vocationally experienced. The Applicant teachers, on the other hand, might tend to be in teaching a little more because of their interest in the subject matter, with teaching as an avenue of expressing this interest as somewhat more fortuitous or circumstantial. The reversal of these trends in the non-public schools tends to suggest again that the non-public school is a "horse of a different color", and that the dynamics involved in the non-public school may be somewhat different than those in the public school. However, it should be remembered that many non-public school teachers are in teaching as a corollary of their positions as nuns or fathers in the parochial schools. Those in this category might well be the Applicant teachers responsible for this trend reversal in this area.

The tendency of Non-applicant teachers to be less career-oriented in Science and Math and/or in teaching, to be on tenure less, to have certification deficiencies more, to have fewer extra-curricular supervision duties, all suggest that the Non-applicant teacher is a low energy type, with less motivation, and less career direction than is true of the Applicant teacher. This appears to be somewhat of a basic part of his personality, as a somewhat less professionally oriented, somewhat less active person. Further evidence along these lines is shown by the comparatively high percentage of the Non-applicants who do not either travel, work, or attend summer school, and by relatively few who hold extra jobs during the school year as compared to the AR Group. In general, they do not appear to be very strongly oriented toward self-improvement.

As discovered in the Preliminary Analysis, there is no relationship between application and spending a large proportion of time outside class grading papers, preparing lessons, etc. The AR's have the highest percentage of extra work; the NA Group the smallest of the three groups. These findings suggest that whatever the reason for non-application, it is probably not that the people in the NA Group are any busier than those in the other two groups.

Attitude toward Work

As was found in the Preliminary Report, a Non-applicant is somewhat less likely to indicate that he will be teaching Math or Science five or ten years from now as compared to the AA Group. While most of all three criterion groups intend to stay in education and in Mathematics and/or Science teaching, there is a somewhat stronger tendency for Non-applicants to be undecided. It is significant, however, that all teachers feel that the best method of furthering their goals, whatever they may be, is by taking additional educational training rather than by taking Programs or Institutes. It is interesting to note that apparently NSF Programs are not seen as being in the same class as taking courses at a university. The reason for this does not seem to be clear, but perhaps involves degree credit and/or programs leading toward a degree.

In addition to their relative lack of motivation and career improvement motivation, NA's are less perceptive about their professional lacks. One of the most significant differences between AA's and NA's was the recognition by the AA's of the need for keeping up with developments in the field in general and by specific actions. NA's, when they do see this need, tend to give the generalized response that they prefer to keep up by reading, while the AA's are characterized by being willing to take more definitive and specific action such as attending workshops and getting an advanced degree, etc. The claim of the NA's that they will read to keep up with professional developments is to some extent a hollow one, because additional evidence indicates that they subscribe to fewer professional journals and belong to fewer professional organizations, and in general do less reading than is true of the AA's.

While the differences did not come out particularly strongly, there is no doubt that, at least to some degree, the Non-applicant teachers tend to find their job satisfactions comparatively more in their own personal growth and satisfaction (or their own perceptions of it) than in their interactions with students. Comparatively, the AA's find their satisfactions more in the contributions they feel that they make to society, and in satisfactions growing out of their association with professional associates. These differences suggest that the Non-applicant teacher is more self-centered than the Applicant teacher, and that he emphasizes more a student to teacher relationship, while the AA teacher finds a more exterior-directed satisfaction. It is quite possible that the differences here are even sharper than the data indicate because the category of student related satisfactions is not sufficiently well structured to demonstrate what has been suggested by these results and other parts of the data--that is, that Applicants tend to find the teaching relationship at least partially a source of outlet for their subject matter interest, while Non-applicants tend more to find satisfaction in the teaching relationship itself and in their relationships with students.

It is interesting to note that in the Non-applicant Group grading is a particular dislike, while the AA's particularly dislike bookkeeping and clerical chores associated with teaching. Of course, all groups have as one of their major dislikes paper work of all kinds. However, the grading difference is interesting because it suggests that the Non-applicant is unhappy about putting himself in the position where he must form an evaluation and pass that evaluation along. On the other hand, the AA's are less concerned with the problems of evaluation, but more annoyed with the routine non-subject matter, non-teaching related aspects of record keeping and clerical chores. As mentioned earlier, the NA's tend to feel relatively less professional, and are relatively less interested in professional activities. This is particularly true in the junior high schools where the lack of emphasis on professional activities raises a serious question about the extent to which these people can really be called professional in the area of Math and Science. This is consistent with the frequent observation that the more competent teachers tend to teach at higher levels subject-matter-wise. Again, we get a picture of the Non-applicant as being someone who is engaging in Math and Science primarily for other purposes such as the inter-personal teaching relationship with students, whereas the Applicant again tends to generate the idea that he is more interested in the professional subject matter of the field.

Self-Concepts

One of the most distinguishing features between the AA's and NA's was the feeling of the NA's that they were comparatively less well prepared in subject matter. Of course, this feeling has its basis in fact, since the data would indicate that the NA's are indeed less well prepared in subject matter, and NSF Program selection procedures might have affected this finding. It is to the credit of the NA's that they admit to subject matter deficiencies as weak points, but it further raises the question as to why they don't do something about such weak points, particularly since they are less likely to attend summer school, don't apply for NSF Programs, and are less likely to be taking graduate work. The subject matter emphasis of the AA teachers again comes out here in their concern that part of their deficiencies may be that they expect too much of their students, and they have some lack of ability to adjust to group differences. On the other hand, the NA teacher tends to feel he is somewhat too easy going on his students which again underlines his lack of ability to crack down, probably because of a fear of alienating students in the student-teacher relationship.

Attitudes toward NSF Programs

With respect to purposes of NSF Programs, the AA Group sees broadening and up-dating as purposes more often than the NA teachers. However, it is particularly up-dating which they see as a purpose more frequently than the NA teachers, which suggests again that the Non-applicant may not be as aware of his subject matter deficiencies as the Applicant teacher. He, of course, knows that if he is teaching a course in Physics, and has had no Physics background, he needs broadening in his background. However, he is likely, if he is teaching a course in Biology and has had a Biology course, to feel that the field isn't developing (perhaps because he hasn't been keeping up with developments) and thus that he doesn't need to be up-dated on the information that he presents in his classes. The practical bent of the AA's, which was suggested in their impatience with record keeping activities also comes to the fore in their mention of improvement of teaching techniques as a purpose comparatively more than NA's.

The AA Group said that it applied primarily for self-improvement reasons, emphasizing up-dating and broadening, along with improved teaching methodology. This was followed by financial assistance. These findings again emphasize the relative interest of the AA Group in subject matter areas and their strong interest in self-improvement via courses including workshops. Perhaps one of the more important dynamics here is that the AA's see NSF Programs as educational activities fitting into their general self-improvement via education needs. The NA's do not seem to see self-improvement educational activities as being strongly related to their own needs.

The Non-applicant emphasis on family obligations mentioned frequently by women, and financial obligations including having another job, having a permanent summer job, or being able to make more money elsewhere, etc., mentioned more frequently by men, indicated that this NA Group felt that it personally did not apply because of responsibilities of one kind or another. Additional reasons, such as other time demands, irrelevancy, poor location, and lack of background, each of which probably having some basis in fact, would still tend to suggest that the motivational level and drive level of this group is comparatively low. About 0-5% reported not applying because of financial need. However, 15-23% of public school male NA's reported being able to make more money elsewhere or being reluctant to give up an established job. It should be noted that the emphasis on financial obligations, particularly by the men, does not necessarily indicate that the NSF stipends are too low, but may simply indicate inertia in a lack of desire to try for something new, particularly something out of town, where arrangements to do equally well have been made within town without so much effort. This is consistent with their relatively lower venturesomeness in general. In addition, the differences in income between NA's and AA's are not great, their obligations appear to differ little, and it is likely that money considerations are not a very strong factor in non-application. Also very few of the teachers suggested increased stipends as a Program change.

When asked why other teachers would not apply, the AA teachers in the public high schools tended to mention reasons categorized under low drive, indifference and complacency to a greater degree than NA's. The types of reasons mentioned were much the same, but it is worth noticing that, as compared to their own self-improvement and drive level, the AA's felt that the NA's might be somewhat more indifferent and complacent and less well motivated. These results were borne out by findings from the school principals. While family responsibilities were mentioned as a main reason by all principals, Non-applicant schools mentioned other commitments and obligations more frequently that Non-applicants would be complacent and satisfied with their own educational level.

Non-attending groups reported that other teachers presented a favorable report of the Programs which they attended, and Applicant Group was more critical. This is partially a function of the greater knowledge of the AA's about NSF Programs, but also may be an in-group, out-group phenomenon in which those who have not attended are presented with the "everything is peaches and cream" story, whereas those who have attended are in the in-group and the difficulties can be discussed more frankly.

Summing up this area, then, it would appear that there is legitimate reason for Non-applicants not to attend due to family and financial reasons, but probably no more so than for Applicants. Thus the additional emphasis on such other obligations takes the form of a rationalization of low drive level and low motivation.

Although a significant percentage of the NA teachers were not familiar with the Programs, possible Program modifications mentioned more frequently by AA teachers include the need for more work on methods and techniques. This tends to again underline the picture of the AA Group as being a more practical group. However, more females than males were interested in this area, probably reflecting a somewhat insecure basis for the females in their classroom control. NA teachers in general seemed to be more concerned with availability of Programs, again underlining their lack of willingness to venture out very far for the purpose of self-improvement.

Male - Female Comparisons

The differences discovered between male and female attitudes toward teaching and NSF Programs have several implications. The relatively higher proportion of Non-applicants among females follows naturally from their comparative lack of concern with subject matter per se, from their probable perception of their jobs as secondary to those of their husbands, from their concern with their family responsibilities and from their comparative lack of venturesomeness. Of course it should also be noted that men are objectively more free to "pick up and go" whether to attend NSF Programs or otherwise than are women. Women tend more than men to see the community as more negative toward Science and education, particularly for the Non-applicants, and to see their colleagues as less favorably inclined toward Science and education. This may be a reflection of their own feelings toward Science and education, perhaps their own dissatisfaction with having to work at all, as much as in this field.

The above information tends to suggest, then, that the woman is even less subject matter oriented than the man, and that she is not necessarily particularly happy subject-matter-wise. She is interested and concerned with teaching and is not venturesome and not interested in leaving her home or family for the purpose of attendance at Institutes or other educational activities. However the fact that twice as many senior high women (22-23%) as men entered teaching because of interest in the subject matter indicates a hard core of women who are in the teaching of Math/Science more for subject matter reasons. This group probably entered teaching as a socially acceptable outlet for interests which otherwise would have led her to predominantly male occupations such as engineering.

Programs which expect to attract applications from this group may have to make concessions to some of the above characteristics in the direction of greater availability, convenience and perhaps more emphasis on teaching methodology.

Inter-School Comparisons

In general the main impression gained about the non-public schools is that the divergence of Applicants and Non-applicants with respect to subject matter concern is greater than in the public schools. It would appear that the Non-applicants have not established a personal identification with the field of Math/Science teaching--perhaps they have simply been assigned their duties in this area. They are poorly motivated toward self-improvement and change, and tend to favor less active ways of keeping up, such as reading rather than NSF Programs.

Applicants, on the other hand, and contrary to the public school findings, fixed on Math/Science teaching early, perhaps as part of a broad field of interest in interpersonal relationships (or religion). This latter conclusion is suggested by the fact that twice as many AA's as NA's went into teaching as a corollary of another job (often a [illegible]). Hence teaching and NSF application may be seen as part of their responsibility. The evidence indicates that application is not related to salary improvement, but is more in response to subject matter concerns. The even greater influence of supervisors on application in this group as compared to public schools appears to offer the most hopeful avenue for attracting Non-applicants.

Generally, although there are numerous contradictions on the surface, the non-public school Non-applicant is not too different from his public school counterpart. His entry into teaching may arise from somewhat different motives, and he may be more subject to the influences of his superiors, but all in all he seems to be a similar type. He is probably less of a low-drive type and more non-identified with the subject matter than in the public schools.

Probably the outstanding aspect of the junior high findings was the relatively low level of subject matter professionalism of the teachers. This suggests that Programs appealing to this group must aim on a lower subject matter level and perhaps place more emphasis on educational methodology. This is not to suggest that subject matter concerns be abandoned--only that the subject matter must be carefully tailored to the needs of the junior high school situation.

Part Three - A Conceptualization

As in the Preliminary Report, it would appear to be useful to consider at this point some psychological conceptualizations which might fit the data and describe some of the behaviors and behavioral implications regarding the Non-applicant Group. In doing this, however, it is to be cautioned again that the differences found between the NA's and the AA's were often differences of degree, a rather small degree at times, and certainly not differences in kind. Probably, all things considered, the Non-applicants and the Applicants are more like each other than dissimilar. Certainly it should not be taken that they are as different from each other as night and day, or that the differences pointed out are this extreme.

Before drawing a psychological picture of the Non-applicant, it is well to keep in mind the milieu in which he functions. It is the feeling of the staff that it is exceptionally important to remember that the Non-applicant tends to come from a small school in a small town, and that such an environment is likely to be characterized by a narrow conservatism, a "small town attitude", in which Science and education are seen in the traditional conservative light. In such a milieu, particularly considering the small town aspects where everyone is aware of what everyone else does, innovations such as attendance at NSF Programs may often be considered "out of place". Indeed, the evidence supports the conclusion that the community attitude and the attitude of others in the Non-applicant teacher's environment is significantly less favorable toward Math and Science than is true for other groups. Further, Non-applicant schools tend to be located where there are lower percentages of professional and clerical people which again may indicate towns where the attitude is more rural and less progressive. Further evidence is the fact that in Non-applicant schools course offerings and grouping in Math and Science tend to be somewhat less extensive, salaries tend to be somewhat lower, and students tend to have somewhat less ability. (Of course, such situations may be expected to attract less professional Math/Science teachers.)

Thus, the teacher's perceptions of the community and his environment as being somewhat less favorable to Math and Science in general are undoubtedly correct, although they may be to some extent a projection of his personal feelings toward Math and Science. A teacher will normally identify himself somewhat with his community and environment, and he is likely to assimilate its attitudes and beliefs to some degree. In addition, many NA's may have grown up in similar environments. On the other hand, he will also normally identify himself with his job and subject matter field. These somewhat counter-motivations may well lead him into a personality conflict in which he is both favorably and unfavorably inclined toward his own vocational field. The behavioral result of such a personality conflict is likely to be the avoidance of any situation (NSF Programs) which would tend to stir up the conflict and a compensatory emphasis on the safer (teaching) aspects of the job. In other words, he would prefer being known as a teacher rather than as a scientist.

Keeping in mind the environmental setting in which the Non-applicant teacher is likely to be found, it should be pointed out that he tends to be a personality which is reserved and conservative and perhaps, somewhat contrary to the findings of the Preliminary Report, less subject to external motivation than is true of the AA Group. Although Non-applicant school principals are less favorable to NSF Programs than Applicant school principals, they still recommend NSF Institutes quite strongly. However, many Non-applicant teachers have been capable of resisting such recommendations, and this seems to suggest that they are not as susceptible to external influence as was originally proposed. Exceptions to this will be noted later.

In brief, the Non-applicant is comparatively an intellectual complacent--that is, he is less aware of the nature and extent of his subject matter deficiencies; he does not recognize the need for up-dating as strongly as for broadening; he does not recognize the need for keeping up in his field as strongly; he is not as susceptible to principal's recommendation to apply for NSF Programs; and he places great stock in his strong points of interest, understanding and concern for the student. In addition he feels equally if not more often than the AA, that he is competent in putting across material.

Thus, the first big personality point of the Non-applicant appears to be that he tends to be comparatively complacent and self-satisfied, particularly in his approach toward subject matter.

The second personality factor which appears extremely important in the Non-applicant personality is that he tends to be comparatively more oriented toward the processes and interactions of teaching rather than the subject matter field. While it is quite true that most of all teachers are in teaching because of their interest in the students and the interactive processes of teaching procedure, this is even more true of the Non-applicant teacher than the Applicant. He tended to settle on teaching as a vocational field without the extent of trial and error in other vocational areas which characterized the AA Group. He reports more often that his own personal growth and satisfactions are important teaching satisfactions. He seems to be less willing to jeopardize his student-teacher relationships by raising discipline problems or "cracking down" on students, and is somewhat unhappy about the necessity of grading or evaluating, probably for the same reason. His concern for the subject matter is probably mostly a vehicle for the inter-personal relationships from which he derives the most satisfaction in the classroom. This probably explains to some extent his relatively complacent approach to subject matter--he tends to see it as of secondary importance to teaching per se.

Thus, the second big characteristic of the Non-applicant personality seems to be a relatively low identification with the subject matter area in favor of satisfactions derived from inter-personal processes of teaching. This tends to be a self-centered approach to teaching wherein teaching is engaged in for the purpose of satisfactions derived by the teacher, rather than the purpose of satisfactions derived from the impact of teaching others.

The third major factor in the Non-applicant personality tends to be what is generally a low motivation, low-drive level. The Non-applicant tends to be a non-joiner. He is again reserved, a conservative personality, not interested in associating himself with professional organizations or in extending his field of action, particularly to new endeavors. He is less likely to engage in organized summer activities, to take extra jobs, or to engage in extra community activities. In general, then, it would appear that he has a low motivational, low-energy level and thus would not be likely to respond to appeals which require him to exert a considerable amount of effort.

A word or two might be said about the personality of the AA Group. It would appear that the most prominent concern in the minds of the AA's is their subject matter competency, as this is most frequently mentioned as a strong point, and most frequently mentioned as a deficiency. It should be further mentioned that they tend to find their satisfactions to a somewhat larger degree in their interaction with the subject matter and in associations with their fellow professionals, in joining professional associations, and in reading professional journals. They tend to become impatient with routine, clerical activities, and they are interested in methodology as well as subject matter.

Comparatively speaking, it appears that it is the AA Group which is somewhat more susceptible to external influence. As mentioned above, some of its sources of satisfactions are externally derived. In addition, it would appear that when principals and supervisors have recommended attendance at NSF Programs, it has been the AA Group which has resonded to these recommendations (again you see an externally derived motivator). It would appear that the AA Group is certainly a much higher energy level group, but the direction of this energy appears to be toward goals derived from external sources. Perhaps they have introjected (assimilated) standards from the culture at large--that teachers ought to be the best prepared possible. They are idealistic in that they have made cultural standards a part of their basic personalities. Once they have assimilated the idea that teachers must be the best prepared possible, their concern with subject matter and subject matter preparation becomes clear. Upon learning about NSF Institutes through brochures, literature, and/or supervisors' recommendations, it then becomes a source of discomfort to them that they are not living up to those high standards of preparation which they have adopted for themselves, and so they feel impelled to apply for NSF Programs. It is likely that if new Programs, etc., were initiated, they would again feel impelled to apply.

It will be recalled that in the Preliminary Analysis, it was proposed that the Non-applicant appeared to be a personality type dependent upon others for motivational impetus. It does not now appear that this is so, with certain exceptions. It is hypothesized that the interpretation of the Non-applicant as a rather passive, dependent person, which was presented in the Preliminary Report arose because the influence of women was not separated out for the Preliminary Analysis. In looking at women, whose cultural role has always been that of passive interaction with environment, we find that even though there are more married men than women among the Non-applicants, women give much more frequently family responsibilities as the reason that they cannot apply for NSF Institutes. It would appear that since, as stated, there are more married men than women, and since there are no significant differences in dependents or marital status between Applicants and Non-applicants, that the concern of

Non-applicant women with family responsibilities indeed marks them as passive, dependent types whose first thought when presented with a demand from environment that they apply for Programs is to retreat into the traditional cultural role of the woman--that is, the family and home situation. The upshot of this situation is that the dynamics which lie behind non-application for women and for men may quite well be considerably different. It would appear that the man, on the one hand, is more self-confident and intellectually complacent, whereas the woman is less self-confident and perhaps much more susceptible to external motivation. This finding would lead to the conclusion that the re-emphasis on application by principals and superiors might work much better with women than with men.

Some additional psychological implications of the findings presented above should be discussed. First, subject matter becomes a vehicle by which the Non-applicant teacher contacts the student and obtains a self-gratification required by his personality pattern. It might be hypothesized that this type of teacher likes to be admired, to be looked up to, to be regarded by the students as a leader and a source of information and to be respected and appreciated. Should any conflict of desires appear for this type of teacher, it is the emotional satisfactions involved in teaching which are likely to prevail over the intellectual aspects and the intellectual stimulation and satisfaction derived from dealing with the subject matter. It may be predicted that this type of teacher will resist any situation in which he will be presented to his students in a less favorable light or in which he will have to engage in any activities which will make his students feel less favorable toward him. Such situations would include presenting new and difficult material which may not be well accepted by the students; or situations in which it is necessary for the teacher to criticize, correct, evaluate, or discipline students.

While there was ample evidence that the Non-applicant teachers seemed to be less aware of or concerned with their subject matter deficiencies, one of the most distinguishing features between the AA's and NA's was the feeling of the NA's that they were comparatively less well prepared in subject matter. However, they were also distinguished by the feeling that they did not need to keep up, and that the purposes of NSF were broadening rather than up-dating. This leads to the conclusion that the Non-applicant teacher has convinced himself that he knows a sufficient amount to get along beautifully in the classroom. However, he is sufficiently aware of some subject matter deficiencies to suspect that he would be distinctly uncomfortable in a situation in which he would have to compete with others with an unknown, but probably greater degree of subject matter competence, particularly if such a situation should have any reflection or consequences for the esteem in which he may be held by his students. It is quite likely that he will pass by NSF Programs with the off-the-cuff statement that, "Oh, well, that's for others--I'm pretty well fixed". If he were required to attend, and did attend, he might very likely find that his own inadequacies would be revealed to him in much greater detail. This would undoubtedly be damaging to his self-esteem, self-confidence and perhaps his teaching competence if he were to fail or be forced to drop the Program. The conscious or subconscious recognition of this condition is probably an important factor in non-application.

Further, even when Non-applicants are so inclined, the evidence appears to suggest that this group is of such a low drive level and such a low motivation group that it will be content to proceed more or less at status quo rather than to develop a strong drive toward self-improvement or change of any sort. It would be predicted that even if this group desired the change involved, it would be likely to drift with the change rather than to actively seek it. It is highly likely that most of the objections that the Non-applicant Group gives to application such as other obligations (financial and family), other time commitments, etc., tend to be at least partially "reasons of convenience" to make it acceptable not to apply to Programs. This interpretation is confirmed by noting that the other groups are certainly no more busy and no more commited and no more tied down by responsibilities than are the NA's. It seems highly unlikely that they take their responsibilities and obligations any less seriously than the NA's do, which leads to the conclusion that the use of these reasons by the NA Group is primarily for convenience. This is not to say that they do not believe that their use of these reasons is valid; it is simply to say that their use of these reasons is a personality function rather than a function of objective fact.

In summary, we see the Non-applicant personality as being characterized by low motivation, low subject matter interest, and a certain degree of intellectual complacency. These factors are not to be thought of as independent but rather as interdependent--that is, non-application is due to a mixture of all three (and probably others). The data do not permit saying which is most important, and undoubtedly this varies from individual to individual. Thus, the teacher doesn't apply because he doesn't feel he needs to, because subject matter is of secondary concern, or because subject matter is not sufficiently important to motivate him--or any combination of the three.

VII. Non-Target Group Analyses

This Chapter presents the findings for the Non-Target Group--teachers teaching Math/Science less than 40% time. The data summarized below are found in Appendices A, B, C, G, and H. Questionnaire analyses are presented in Part One followed by Interview Analyses in Part Two. It is important to remember that the Non-Target Group is a comparatively small one, particularly when subdivided by school types and criterion groups. Since 80-82% of the Non-Target sample for both interviews and questionnaires is found in the NA Group, the percentages for AR and AA Groups are invariably based on very small N's. Tests of statistical significance were deemed impractical because of the differential weighting and variable N's. Therefore, comparisons involving the AR and AA Groups should be interpreted cautiously.

Part One - Questionnaire Analyses

The data in this section are organized according to broad areas by school types similarly to the Target Group analyses of Chapter IV. Again the focus is kept on the relationships with application. It should be remembered, however, that the correlations presented are probably attenuated due to the high proportion of Non-applicants in these groups.

A. Background

1. Public Senior Highs. There appear to be no significant differences in marital status among the three criterion groups--roughly three-quarters are married and living with spouse. Men predominate about 2 to 1, but no relationship between application and sex was discovered. The average Non-Target teacher is 36.3 years old and has 2.0 dependents, the youngest of whom is 5.5 years old. There is no relationship between these variables and application.

2. Non-Public Schools. Only about 10% of the teachers in the Non-Target Group come from the non-public high schools (about 2 to 1 from the parochial schools). However, of these over 91% are in the Non-applicant category. Because of this the AA and AR Groups are too small to analyze and comments for non-public schools must be confined to the NA's. Here about 30% are married and living with spouse, and women outnumber men by 3 to 1. The average teacher is 44.2 years old and has an average of .68 dependents. The more the dependents, the more likely the teacher is to be an applicant (r = .27).

3. Junior Highs. The junior high teachers account for about a quarter of the Non-Target Group and are over 80% non-applicants. A little over 70% of the AA and NA teachers are married and living with spouse as compared to seven-eighths of the AR's. These teachers are men about 2 to 1, average 36.3 years old and have an average of 1.6 dependents of whom the youngest averages 6.7 years old. However, none of these variables appears to be significantly related to application.

4. Summary. While there are some interesting differences between public and non-public schools, little relationship was discovered between these background variables and application.

B. Educational Background

1. Public Senior Highs. Less than half of the NA Group, but more than 60% of the AA Group attended publicly operated under-graduate schools, but there is little difference in the percentage of the three groups that attended private and other types of schools. Table VII-1 summarizes graduate and undergraduate majors. The distribution of undergraduate majors is about the same in the three groups, with the NA Group showing about half of its undergraduate majors in other than Education, Science or Math, the AR Group a little less, and the AA Group a little more. In addition, a noticeably larger percentage of the AR Group has Education majors only (20%). A significant relationship was found, however, between the number of hours of undergraduate Physics and application.

The distribution of undergraduate degrees is fairly comparable for the three groups. However, it is worth noting that the AR Group shows a somewhat higher percentage of Education degrees than the other two groups (17%), that the NA Group shows 3.4% having no degree as compared to none for each of the other two groups, and that the AA Group shows a somewhat higher percentage (38%) having a B.A.

Of those who have taken some graduate work again the tendency is for the NA Group to have attended a larger proportion of other-than-state colleges than either of the other two groups, particularly the AR Group; and for the AR Group to have attended a relatively large proportion (about 30%) of state operated or public operated teachers colleges. Only half of the AA Group reported no graduate work as compared to about 73% of the NA Group and 68% of the AR Group. The correlational analyses showed a significant relationship (.24) between application and total number of graduate hours. Again it may be seen that the AR group has a far greater proportion of Education majors (over 70%) as compared to the NA and AA groups (56% and 53%, respectively), while the AA group has a much larger proportion of Science and Science-Math, Science-Education majors. On the other hand, of those who have obtained a graduate degree, none of the AR Group as compared to 45.5% and 46.1% of the NA and the AA Group obtained a Master of Education degree. About 54% of the AR Group as compared to 19.6% and 13.1% of the NA and AA Groups received a Master of Science degree, and the respective percentages for an M.A. are 46%, 34.5%, and 40.8%. This latter finding is difficult to interpret, but may be partially a function of the schools attended. It would appear that many of those who noted a graduate major in Education did not receive a Master of Education but instead received a Master of Science or a Master of Arts. While in the other two Groups, there was relatively close correspondence between the percentage who specified Education as a graduate major and the percentage that received a Master of Education as their graduate degree.

Table VII-1

Graduate and Undergraduate Majors by Criterion Group and Type of School

School	Undergraduate		% Reporting	Graduate	
	Math-Sci.	Educ.	Grad. Work	Math-Sci.	Educ.
Public					
AR	34.8	19.6	32.2	2.2	72.4
NA	34.9	11.1	27.1	10.7	56.5
AA	35.8	10.2	49.7	22.5	52.7
Non-Public					
AR*					
NA	33.3	16.8	18.4	10.3	48.4
AA*					
Junior					
AR	60.9	---	41.3	24.9	75.1
NA	56.1	---	29.0	6.6	51.7
AA	67.4	---	44.2	38.2	61.8

* N's too small to compute percentages

2. Non-public Schools. Some 79% of these teachers report that they attended a non-public undergraduate school. About 31% report that they majored in other than Science, Math, or Education, with those latter categories running something like 16% to 19% each. Undergraduate degrees were about 46% B.A.'s as compared to about half that many B.S.'s and Bachelor's of Education. Only 18.4% of this group attended graduate school, the vast majority of these at non-public colleges. Nevertheless the correlation between application and total number of graduate hours approaches significance. About half of them majored in Education, and about a third in other than Science, Math, or Education. About half of those that received a degree received an M.A.

3. Junior Highs. With respect to undergraduate schools attended, the most obvious difference among the three groups is that the AR Group has attended publicly operated teachers colleges much more than the other two (23% vs. 10% vs. 0%, respectively). The AA Group has a substantially larger percentage (44%) who have attended non-public institutions. About 54% of the AR Group and 43% of the AA Group as compared to 17% of the NA Group take a Science, Science-Education, or Science-Math degree. The ratio of B.S.'s to B.A.'s is substantially larger for the AA Group (59% vs. 23%) as compared to the AR and NA Groups. In addition there are significant correlations between application and the number of hours of undergraduate Chemistry and Physics taken.

Again, with respect to graduate education, the NA Group reports significantly more non-attendance at graduate school than the other two groups (71% vs. 59% and 56% for the other two groups). Again, total number of graduate hours correlates (.38) with application. Of those who do take graduate work, the largest percentage go to a publicly supported institution, particularly for the AA Group. Of those taking graduate work, the majority do so with a major in Education (75%, 52%, and 62% for the AR, NA, and AA Groups). The AA Group has a larger percentage in Science and Science-Education (38%) as compared to 25% and 7% for the AR and NA Groups. The NA Group has a large proportion (42%) in the non-Education, -Science, or -Math fields as compared to none in these other areas for these other two groups.

Again in spite of their heavy concentration of Education majors, the AR Group obtains no Masters in Education and is about equally divided between Master of Science and Master of Arts. In contrast, the NA Group obtains 54% M.Ed.'s with only 14% Master's of Science and 32% Master's of Arts. The AA Group obtains 36.5% M.Ed.'s, almost 20% M.S.'s, and about 17% M.A.'s, with approximately 27% of those taking graduate work omitting the question.

4. Summary. In general, the Applicant Groups, particularly the AA's, have the most training in Science/Math, both on graduate and undergraduate levels. In addition they have significantly more hours of graduate training in general. Though it is not reflected by the degrees they obtain, the AR Group appears to be much more oriented toward education majors. The Non-applicant Group and the non-public groups tend to attend non-public colleges, while the Applicants go to state supported schools (the AR's particularly to teachers colleges).

C. Work Experience

1. Public Senior Highs. While no relationship was observed between years of teaching experience and application, significant relationships occured between application and per cent time teaching Chemistry and Physics and per cent time teaching Math/Science. A negative relationship occurred with per cent time teaching other subjects.

About twice as many in the NA Group as in the other two groups (13%) indicated a certification deficiency in the form of temporary or emergency certificate. The figures suggest clearly that such deficiency as exists is usually in Science or Math, although a small percentage of both the AR and NA Groups report education deficiencies as opposed to none of the AA Group. It is also interesting to note that while 88% of the AR Group reports itself as permanently certified, 34% report deficiency in Math and Science. The comparable figures for the other two groups are 76% and 14% for the NA, and 84% and 24% for the AA Group. Thus, both the AR and the AA Groups, while reporting larger percentages of permanently certified teachers also report larger percentages of certification deficiencies in Science and Math. Possible explanations are that permanent certification for many of these teachers does not involve all the Mathematics and Science these teachers feel is necessary for them to have on the one hand, or that additional Science and Math requirements have been instituted since they were certified on the other. There is also some suggestion that they are more critical about the requirements in Science and Math than the NA Group.

A fourth to a third of each group has been placed on tenure. However, fewer (38%) of the NA Group report that there is no tenure available in their school systems (compared to about 56 or 57 per cent for the other two groups). NA teachers report that 25% have a tenure plan, but have not yet been placed on tenure as compared to 16.7% for the AR and 11.4% for the AA Groups. Thus the AA Group has achieved tenure to a greater degree where tenure is available than is true in the other two groups.

Teachers in the AR Group tend to supervise extracurricular activities primarily in areas other than Math and Science, only 17.5% reporting no extracurricular activities to supervise, as compared to 42-43% of the other groups. However, both of the other groups also tend to supervise extracurricular activities more in the non-Science or Math areas than in Science and Math with little difference among the groups in the Science/Math extracurricular activities supervised.

With respect to career intentions, almost all of the AA Group intends to remain in secondary teaching as compared to 90% and 71% of the AR and NA Groups, respectively. Most of the dissenting NA Group are in the undecided category (21-22%). It is interesting to note that in the AR Group a full 10% say "no" to this question as compared to 7% of the NA Group and none of the AA Group. With respect to remaining in the teaching of Science and Math specifically, a full 17% of the NA Group reports "no" as compared to 2.1% and 4.5% of the AR and AA Groups, respectively.

2. Non-public Schools. Again, no significant relationships were found between application and years of teaching experience. The only significant relationship in this area was a negative one between application and per cent time teaching non-Science/Math subjects (-.38).

Only 63% of the Non-applicants report being permanently or fully certified, while 16.5% report no certificate. A large proportion of omits in answer to certification deficiency (24%) suggests that certification deficiency may not be an appropriate question for some of these teachers. Almost 90% report that there is no tenure in their system. Very few of these teachers are responsible for extracurricular activities.

A full 15% report that they do not intend to stay in secondary teaching, and 8% are undecided. The figures are approximately the same for remaining in Math and Science teaching.

3. Junior Highs. Again years of teaching experience shows no relationship with application, but per cent time teaching Math/Science and Chemistry and Physics do (.32 each).

The certification picture is somewhat uncertain, with approximately 78% or so of both the AR and NA Groups being fully certified as compared to 69% of the AA Group. However, there were a large proportion of "other" responses in both the AR and AA Groups. With respect to deficiency, the NA Group reports about 65% who have no deficiency as compared to 56% in the AR and 58% in the AA Groups. The AR Group admits to 21% with a deficiency in Science or Math as compared to 13% for NA and 9.5% for AA's. Thus the AA Group seems less well certified here, although better prepared in Science/Math.

With respect to the tenure situation, it would appear that the AA Group works in systems where there is slightly more tenure available (82% as compared to 71% and 76% for AR and NA). On the other hand, 32% of the NA Group reports a tenure plan existing, but that they have not been given tenure as compared to only 10.5% of the AR and 28.5% of the AA Groups. Thus, although it is a group with the least amount of tenure available, far and away the greatest percentage of teachers placed on tenure in these three groups is in the AR Group with 61% as compared to 37% for the NA Group and 46% for the AA Group.

The NA Group has the least responsibility for supervision of extracurricular activities--54%, as compared to 34% and 46% for the AR and AA Groups respectively. The AR Group has a large responsibility for supervision of Science activities (35%) as compared to 3% and 0% for the NA and AA Groups.

With respect to staying in secondary teaching, about 75% of the AR Group as compared to 87% and 82% of the NA and AA Groups intend to remain in secondary teaching as a career. Twenty-five per cent of the AR Group as compared to 2% and none of the NA and AA Groups say that they do not intend to remain. In regard to remaining in Math and Science teaching, 64% of the AR Group, 69% of the NA Group, and all of the AA Group intend to remain in Mathematics and Science teaching. This seems to suggest that the 18%

of the AA Group who did not say they wanted to remain in secondary teaching intend to move into the college area. Sixteen per cent of the AR Group, and 6% of the NA Group indicate that they do not wish to continue teaching Science/Math, while about 20% to 22% of these two groups are undecided.

4. Summary. In general it is clear that per cent time teaching Math/Science subjects tends to be related to application, while per cent time teaching other subjects is negatively related. The certification and tenure picture is not so clear, possibly due to varying definitions and interpretations of the terms. Applicants, particularly AR's, tend to report more certification deficiencies in Math/Science, even though they also tend to report more certified teachers. Also Applicants (particularly AR's) tend to be placed on tenure somewhat more frequently in proportion to the tenure available. It is the AR's who tend to have the most extracurricular supervisory duties (even in Math/Science for junior highs). Career motivation for secondary teaching and Math/Science teaching is strongest for the AA's, weakest for the NA's in the public senior highs. However, in the junior highs it is the AR's who want to get out. Thus, the junior high AR's are a high-drive level group, often on tenure, but not too closely identified with Math/Science and secondary teaching.

D. Outside Activities

1. Public Senior Highs. A much larger proportion (around 59%) of the AR Group has in the past held an outside job during the school year (NA 27.5%, AA 36.5%). However, a much larger proportion of these are relatively non-skilled and unrelated to education types of jobs, and a much smaller proportion of them are related to education or to community participation than for the other two groups. This suggests that the AR Group is a high-drive level relatively low-skill type of group. Table VII-2 shows extra jobs for '59-'61.

Tables VII-3, VII-4, and VII-5 show the distributions of summer activities for the various groups. Several activities during the summer were examined for 1961. It was found that only 17% of the AA Group held a non-school job as compared to 29% of the NA Group and 31% of the AR Group. Only 30% of the NA Group attended summer school as compared to 58% of the AR Group and 56% of the AA Group. These patterns are borne out by the figures for 1959 and 1960. While these patterns are not completely consistent, it may be seen that on the average the AA Group tends to be a high education-oriented, low non-school-job-oriented group, while the AR Group tends to be also high education-oriented, although increasingly so over the years '59 to '61 and a relatively non-school-job-oriented group, although decreasingly so over the last three years. The NA Group, however, tends to be a group which does not seem to be particularly high with respect to the percentage holding non-school jobs, and on the other hand, tends to be increasingly relatively low with respect to percentage attending summer school over the past three year period. It has the largest percentage of inactivity.

2. Non-public Schools. About a third of these teachers reported no summer activities in 1961, and of those who had a summer activity in 1961, the vast majority (over half) attended summer school. However, 14% reported

Table VII-2

Percentage Holding Extra Jobs During Past Three Years by Criterion Group, Year, and Type of School

	AR	NA	AA
1961			
Public	31.1	15.6	14.3
Non-public	*	14.8	*
Junior	9.6	24.7	5.8
1960			
Public	16.7	19.5	23.3
Non-public	*	17.4	*
Junior	37.7	20.8	18.5
1959			
Public	29.3	12.7	23.1
Non-public	*	17.4	*
Junior	47.3	16.9	24.3
All three years			
Public	16.7	8.1	10.3
Non-public	*	14.8	*
Junior	9.6	12.5	---

* N's too small to compute percentages.

Table VII-3

1961 Summer Activities

School	Taught Summer School	Held Non-School Job	Traveled	Attended Summer School	None of These
Public					
AR	11.0	30.9	7.2	58.2	6.4
NA	6.7	28.8	8.5	30.4	31.5
AA	7.2	17.4	8.2	56.3	17.2
Non-Public					
AR*					
NA	6.3	14.3	15.0	36.1	33.8
AA*					
Junior					
AR	10.5	60.4	9.6	19.1	10.9
NA	9.6	35.0	5.5	29.4	26.5
AA	*	42.0	*	28.1	35.7

* N's too small to compute percentages.

Table VII-4

1960 Summer Activities

School	Taught Summer School	Held Non-School Job	Traveled	Attended Summer School	None of These
Public					
AR	6.8	36.0	6.2	36.4	20.7
NA	4.8	35.0	4.1	22.6	35.5
AA	10.0	23.4	9.6	45.7	16.4
Non-Public					
AR*					
NA	8.2	13.5	9.6	21.2	52.8
AA*					
Junior					
AR	20.8	33.6	36.0	---	9.6
NA	3.3	45.1	8.0	18.6	30.6
AA	14.8	25.4	6.1	60.4	14.2

* N's too small to compute percentages.

Table VII-5

1959 Summer Activities

School	Taught Summer School	Held Non-School Job	Traveled	Attended Summer School	None of These
Public					
AR	6.8	53.3	8.3	19.0	12.6
NA	3.5	33.4	4.1	25.9	35.8
AA	6.2	28.9	4.4	53.4	11.4
Non-Public					
AR*					
NA	8.2	15.3	5.6	23.2	52.2
AA*					
Junior					
AR	20.8	49.2	9.6	21.4	9.6
NA	4.2	41.4	7.2	19.1	33.2
AA	14.8	55.2	---	29.3	15.5

* N's too small to compute percentages.

holding some non-school job, and 15% reported extensive travel. Figures for 1960 are not greatly different except that a larger percentage (53%) reported no activities during the summer of 1960. Figures for 1959 are similar to those for 1960. About 21% reported holding an extra job during one or more of the last several school years and about 15% during all of the last three years.

3. Junior Highs. With respect to summer activities over the period 1959-61, the NA Group showed a pretty consistent percentage of 35-45% engaged in non-school jobs during the summer time. This compares with somewhat higher figures for the same period for the AR Group, and decreasing figures over the same period for the AA Group. Thus, with respect to non-school jobs during the summer time, the AR Group appears to be stronger on the average, with the AA Group decreasing somewhat, and the NA Group about the same. Otherwise the main activity of the AR Group appears to be teaching summer school 20% in 1959 and 1960, and 10.5% in 1961. The NA Group also spent time on this activity (4-10%). The AA Group spent 15% time on this in 1959 and 1960, but none of them spent any time at it in 1961. The groups report relatively little traveling over this three year period. With respect to attendance at summer school, the groups show considerable fluctuation from year to year, but were not greatly different in 1961.

Again, the AR's outranked the other groups in the proportion of those holding an extra job over the last few years (about half vs. 33-36%). Of those holding jobs, over three-fifths of both AR and AA Groups held jobs not related to education. The NA Group held the highest proportion of education-related jobs. With respect to extra jobs by year, the NA Group showed an increasing trend of 17% to 25% for the years 1959-61, while the AA Group showed an opposite trend of 24-6%, and the AR Group also showed a decrease from 47% to 10% over the same period. The figures for those working all three of the indicated years are 9.6% of the AR, 12.5% of the NA, and none of the AA.

4. Summary. The AR's tend to hold the most outside jobs during the school year, though the trend is decreasing in junior highs. In addition, these are often non-school, unskilled jobs. The NA's had by far the greatest percentage of "none of these" activities for all groups. In the summers the AA's tend to go to summer school, while the AR's hold some non-school job. The NA's appeared to be intermediate on most of these points.

E. Institute Attendance

1. Public Senior Highs. With respect to application for Institutes, a somewhat larger per cent of the AA Group has applied for Summer Institutes than the AR Group (89% vs. 69%). The proportions are somewhat the same for Inservice Institutes (38% vs. 32%) for the AR vs. AA Groups, while they are 13% vs. 6.5% for these two groups for Academic Year Institutes. About 4% of each of these groups have applied for Research Participation Programs, and only 5% of the AR Group as compared to 15.5% of the AA Group for Summer Fellowships. These figures suggest that the AR Group has been somewhat more interested in the Inservice and Academic Year Institutes, while the AA Group has been comparatively more interested in the Summer Programs, both Institutes and Fellowships.

Modal attendance distance for the Summer Institutes was 101-200 miles in 1961, 1000-1500 in 1960, and 101-200 in 1959. Modal attendance for Inservice Institutes was 51-100 miles in 1961, and was confined to within 50 miles for 1960 and within 25 miles for 1959.

2. Non-public Schools. The number of Applicants is insufficient to analyze.

3. Junior Highs. Almost 90% of the AR's as compared to 62% of the AA's have applied at some time in the past to Summer Institutes. This compares with none for the AR Group and 66% for the AA Group with respect to Inservice Institutes, and 10.5% vs. 15.8% for these two groups for Academic Year Institutes. None have applied for Summer Fellowship in either group, and none in the AR vs. 9.7% in the AA have applied for the Research Programs.

With respect to miles away from home for Summer Institutes, in 1961 the modal mileage was 25-50 miles. In 1960, 50-100 miles; in 1959, 1000-1500. It should be noted that these values are based on relatively small N's in each category, and thus the distribtuions might be considered somewhat unstable. With respect to Inservice Institutes, in 1961 all attendance was within a 50-mile range; in 1960 was in a 100-mile range; in 1959, again within a 50-mile range, with the modal attendance for these three years being within 25 miles.

4. Summary. For public senior highs the AA Group has been comparatively more interested in the Summer Programs and the AR in the Academic Year Institutes. For junior highs the AR's were relatively more interested in the Summer Institutes, and the AA's in the Inservice. No clear trends on distance traveled to Institutes emerged.

F. Professional Activities

1. Public Senior Highs. Application was positively related (.14 - .27) to number of professional organizations belonged to, number of Math/Science organizations belonged to, and number of Math/Science journals read. Membership in NEA organizations ran highest in the AA Group, all but 32.5% being members of some NEA organization as compared to all but 54% for the NA Group, and all but 45% for the AR Group. By far the largest proportion of the membership in all three groups is NEA only (41-48%). The AA Group is distinctly larger in its membership in NSTA and NCTM, however. More than twice as many AR's (26%) reported engaging in professional activities such as writing, consulting, and research.

2. Non-public Schools. Correlations of .53 and .68 were found between application and number of professional organizations belonged to and number of Math/Science organizations belonged to. However, a full 89% of these teachers are not members of NEA or its divisions. Ninety-five per cent of them reported no outside professional activities.

3. Junior Highs. Again significant correlations (.24-.49) are found between application and number of professional organizations belonged to,

number of Math/Science organizations belonged to, and also number of journals and number of Math/Science journals read. The NA Group reported 43% not members of NEA in any form, followed by the AR Group, 34%, and the AA Group, 17%. Fifty-four per cent of the NA Group were members of the NEA only, followed by 45% and 42% for the AR and AA Groups. Eleven per cent of the AR Group were members of NSTA as compared to none of the NA, and 31% of the AA. Approximately 10% of the AR and AA Groups were members of NCTM as compared to three per cent of the NA Group. Again, the AR Group claims more writing, consulting, and research (27%) as compared to 16% for the NA, and 22% for the AA Groups. Only 63% of this group claimed no outside professional activities as compared to 78% of the NA Group and 72% of the AA Group.

4. Summary. It seems very clear that professionalism, as indicated by belonging to professional (and particularly Math/Science) organizations, by reading journals (particularly Math/Science journals), and by engaging in various professional activities is quite strongly related to applying for NSF Programs.

G. Financial Data

Significant correlations between salary and application were obtained for public senior and junior high schools, but not for non-public schools (where the salary structure is not comparable). No relationships between application and other income or spouses income were found.

H. Relationships with School Variables

As with the Target Group, a matrix of teacher variables was assembled with selected school variables treated as teacher characteristics. The results are presented below.

1. Public Senior Highs. About 20% of these teachers have applied for Summer Institutes at some time during the last five years; about 9% for Inservice Institutes; and about 4% for Academic Year Institutes. The strongest relationships between school variables and application are with participation in an experimental Math/Science program (.21, .24, and .14 for Summer, Inservice, and Academic Year application), and per-pupil expenditure (.25 and .21 for Summer and Academic Year application). Other variables related to Summer application are starting salary level and percentage of professional fathers, expensive housing, and lack of salary increase for college credit. Other variables related to Inservice application are posting notices of Institutes and younger principals. The amount of the principal's Math/Science training is slightly related to Academic Year application.

2. Non-public schools. About 5% each of these teachers have applied for Summer and Inservice Institutes, and 3% for Academic Year Institutes. Again participation in an experimental Math/Science program is importantly related to application for Summer and Academic Year Institutes (.51 and .36), and approaches significance for Inservice application. Per-pupil expenditure is now negatively related to Summer application (.33), probably because of the atypical financial structure of the non-public schools. This would

tend to suggest that parochial teachers apply more often than private school teachers as the expenditure rate is higher for the latter. Relationships between principal's Math/Science training and Summer and Inservice application approach significance (.25 and .32). The most important relationships for Inservice application are negative ones with the importance of college credits, advanced degrees and inservice training as salary increment factors (.45 - .60). The more experienced principals tend also to go with application. Finally, a negative relationship (.31) was observed between Academic Year application and starting salary level.

3. Junior Highs. About 11% of these teachers have applied for Summer Institutes during the past five years; 7% for Inservice Institutes, and 3% for Academic Year Institutes. Rather few significant relationships were found here. Per cent of parents belonging to PTA was positively related to application for both Summer and Inservice Institutes. Experience of the principal was related to Inservice application and inservice training as a salary increment factor was positively related to Summer Institute application. No significant relationships with Academic Year applications were found.

4. Summary. Summarization is difficult because of the diversity of these findings. However, there is a tendency for application to be associated with Math/Science awareness as indicated by participation in experimental Math/Science programs and higher Math/Science training level of the principal. Summer application seems to be more sensitive to community variables in the public senior highs (such as per-pupil expenditures, high level housing, high starting salary, and large proportions of professional parents). On the other hand, Inservice applications seem to be more associated with principal's characteristics and actions in the public schools (age, experience, posting of notices), and, especially in the non-public schools, with the reduced importance of college credits, advanced degrees, and inservice training in obtaining salary increments.

Part Two - Interview Analyses

Since approximately 82% of the Non-target sample was in the Non-applicant category, there were not sufficient cases to analyze using criterion group comparisons. Therefore, the following analyses of the Non-target group interview material are descriptive of the Non-applicant Group only. Since the Non-applicant Group of the sample is made up roughly equally of males and females, and since there are almost 100 cases in the public senior high schools, sex comparisons are made for the public senior highs. No further cross-comparisons or subdivisions of these analyses were practicable because of the small number of cases in most of the cells. The analysis of the Target group material would suggest that in most cases sex differences discovered for the public senior highs would tend to hold for junior highs, but might not hold for the non-public highs.

A-1. "How did you get into teaching?"

1. Public Senior Highs. In general, the biggest influences on getting into teaching for both males and females were the influence of family (accounting for a fifth to a fourth of males and females), fortuitous circumstances, and early desire. Approximately 43% of the men started in some other career field as compared to approximately 29% of the women. The men also outranked the women in percentage of those who entered the field fortuitously (22% vs. 13%), and as a corollary of another job (18 per cent vs. 0%). On the other hand, more than a third of the women as compared to 13% of the men entered the field through an early desire to go into it. Only 5% of women and 14% of the men entered the field because of an interest in subject matter.

2. Non-public Schools. The biggest reason for entering teaching was entry as a corollary of another job (probably the influence of parochial situations), followed closely by entry as a fortuitous event. Each of these accounts for approximately a third of the teachers. About a quarter of the teachers started in another area or field, about a fifth entered through an early desire to get into teaching, and some (close to a fourth entered through the influence of family and friends. None entered through an interest in the subject matter.

3. Junior Highs. The influence of others (family mostly, but also teachers) accounted for about a third of the entries into teaching. About 45% of this group started in another field, however. Over a third got into teaching through an early desire, while approximately a fifth got there through some fortuitous event.

4. Summary. In summary, relatively few of these Non-applicant teachers in the Non-target Group got into teaching through an interest in the subject matter. Influence of family, however, accounted for close to a fourth in all cases. For public senior highs and for junior highs there was a strong tendency for these teachers to have started in another field (over two-fifths); however, this was less true of public senior high females and

non-public school teachers. A substantial proportion got into teaching through fortuitous events, and again males tend to exceed the females in this respect. An early desire to go into teaching accounted for some 35-36% in the junior high schools and the public senior females. Public senior males and non-public school teachers seemed to be less influenced by early desire. There is a distinct tendency for non-public school teachers to get into teaching as a corollary of another job (the parochial influence). This reason is given much more often by public senior men than by women.

A-2. "Did you ever consider any other occupation?"

1. Public Senior Highs. Almost half of the women, but only about a quarter of the men said that they had never considered any other occupation. About a third of the women, and almost half of the men, said that they had considered another occupation to the extent of taking courses, or beginning.

2. Non-Public Schools. Here we find that about a quarter said that they had never considered any other occupation, while approximately 43% had considered one to the point of taking courses or starting another career.

3. Junior Highs. In the junior highs only 13% had not considered another occupation, while almost half had considered one to the point of beginning on it or taking courses.

4. Summary. It appears to be the female public high school teachers who are most satisfied with their present occupation, followed by the public school males, the non-public school teachers, and the junior high school teachers. Close to a half of all groups except the public senior females have considered other occupations at one point or another to the point of beginning preparation or embarking on different careers.

A-3. "What do you like about teaching?"

1. Public Senior Highs. In general, student related satisfactions come out as the strongest "like" for both males and females. These were made up of a little over a third in working with children, a little under a third in seeing students develop and progress, and about a fifth in seeing students learn and gain knowledge and do well in subject matter. Other "likes" mentioned 9-12% were variety, contributing to society, personal growth and satisfaction, and professional associations. Males did not differ from females, particularly on this question except that they marked variety a little more often.

2. Non-public Schools. The picture here is quite similar, in that student related satisfactions were far and away the most important like in this situation. Almost half of this group indicated working with children, followed by almost two-fifths who liked to see the children learn and gain knowledge. Personal growth and satisfaction accounted for almost a fifth, and contact with students and seeing the students develop accounted for 13% each.

3. Junior Highs. Again, it is student related satisfactions, with emphasis (29%) on working with children. About a quarter of this group mentioned contact and being with students as important. Seeing them learn and develop accounted for over a fifth. The remainder of this group was divided among omits and other reasons.

4. Summary. The major dynamic here was student related satisfactions with particular emphasis on "working with children". Non-public schools tended to mark responses such as seeing the children learn the subject matter more frequently than the other groups. Just plain personal contact seems to be more important in the junior highs than in the other types of schools. Public senior highs tended to give a greater variety of likes than in the other two types of schools. There appears to be little in the way of sex differences on this question.

A-4. "What do you dislike about teaching?"

1. Public Senior Highs. Teaching dislikes were well spread amongst a number of reasons, but of these the most important to the men was long hours and heavy teaching load. Almost a third of them as compared to about a quarter of the females complained about this point. Men also outweighed women about three to one in complaints about salary (23%). On the other hand, females had more difficulty with discipline, a fifth of them mentioning this problem as compared to only 7% of the men. Student motivation claimed the concern of both males and females (11-16%). Record keeping and other paper work was much more annoying to females than to males, 4 times as many of them mentioning this as a bother (28%).

2. Non-public Schools. Again slightly more than a quarter of these teachers complained about long hours and heavy load. The next most common complaint, again about a quarter, had to do with the aspect of paper work involving grading, whereas only a few of these teachers were concerned with record keeping in general. Other dislikes in the teaching area for the non-public school teachers included low salary, discipline problems and slow learners (14-18%).

3. Junior Highs. For the junior highs, the modal response was nothing disliked, given by almost a quarter of the teachers. Long hours, low salary, record keeping, and grading all came in for significant mention for 13 to 19 per cent of these teachers.

4. Summary. Long hours and salary considerations seemed to bother men more than women, whereas discipline and record keeping problems tend to be mentioned by the women. In general, the schools are not greatly different from each other, though the non-public schools seemed to be concerned more about slow learners as a problem. The junior highs seemed to be more satisfied with no dislikes, and to have fewer discipline problems, and the non-public and junior highs tended to have some displeasure with grading problems.

A-5. "What are your strong points as a teacher?"

1. Public Senior Highs. There seem to be some distinct sex differences on this question. About twice as many of the females (21%) as males felt that their strong point was getting along well with students. On the other hand, about twice as many males (28%) felt that their strong point was to get students to do the work, instill enthusiasm, etc. Twenty-one per cent of the females as compared to only 3% of the males felt that one of their strong points was a personal interest in the students, whereas almost three times as many males (29%) felt that subject matter preparation was one of their strengths. About 10-14% of both groups felt that they had communication strengths and good teaching methods, and 24-30% felt that they had effective discipline as a strong point.

2. Non-public Schools. The most frequently mentioned strong point here was preparation in subject matter (30%). Other points mentioned by the non-public schools were getting the students to do the work, good communication and good discipline (19% each), and understanding of students and effective teaching methodology (12-13%).

3. Junior Highs. The junior high responses were spread out over a fairly large area, but concentrated in the broad categories of teacher-student, student-teacher relationships (a third each). Approximately 19% of the junior highs emphasized good discipline as a strong point, followed by effective teaching methodology and getting along with students (16% each).

4. Summary. It would appear that the male emphasis was more on subject matter. Females emphasized getting along with students and personal understanding of them, whereas males tended to emphasize getting the students to do their work and being well prepared to teach the subject matter. Over a quarter of both groups, however, felt that they had good discipline. Differences between the types of schools do not seem particularly pronounced for this question, although the non-public schools emphasized preparation in subject matter considerably more than the junior highs or the public senior females. Interpersonal relationships were important to all groups, and effective communication and teaching methodology and discipline were other major points mentioned.

A-6. "What are your weak points as a teacher?"

1. Public Senior Highs. Not much in the way of sex differences showed up in response to this question. The most important weak point mentioned by both groups was subject matter deficiencies (32-38%). This is followed by keeping up to date in subject matter (10-12%), and lack of patience (8-10%). The females tended to have a little more difficulty in dealing with individual and group differences (13% vs. 3%), while the males tended to have a little more difficulty with organization of their time needs (12 vs. 5 per cent).

2. Non-public Schools. The most important weak point for non-public schools that was mentioned was difficulty with instructional methods (almost

a quarter). This group has also had its difficulties in dealing with individual differences (about a fifth) and in subject matter deficiencies and keeping up to date (18 and 12 per cent, respectively). Individual inexperience, motivating students and inadequate budgeting of time also came in for mention (11-14%).

3. Junior Highs. The most prominent weak point mentioned by junior high school teachers was subject matter deficiency (more than a third). Keeping up to date in the subject matter and inadequate time allowances were mentioned also (10-13%), and instructional methods was a weak point to almost a fifth of these teachers.

4. Summary. While not much in the way of sex differences showed up in these weak points, there are some interesting differences between types of schools. Far and away the most important weak points mentioned by the public senior and junior highs were in subject matter deficiencies. Less than half as many of the non-public teachers mentioned this type of deficiency. In spite of this difference, the related topic of keeping up to date in subject matter appeared only 10-13% across these three groups. Motivation came in as a problem for the non-public schools, but not particularly for the public or junior high schools, while instructional methods seemed to be a weak point of the non-public and junior high schools. Problems in budgeting their time played some 10-14% of these three groups.

A-7. "What do you expect to be doing five or ten years from now?"

1. Public Senior Highs. About two-fifths of the group expected to be doing the same thing in five or ten years as they are now--teaching Science and Math. However, there is a slight edge for the females on this point. Twelve per cent of males as compared to 3% of females expected to be teaching at a higher level. Ten per cent of males as compared to none of the females expected to be in administration. About 6-13% expected to be teaching something else, and about a fifth expected to get out of education, mostly by retiring.

2. Non-public Schools. Slightly more than half of this group expected to be doing the same thing in a few years. About 11% would like to teach at a higher level, but none aspired to an administrative position. Close to a fifth would like to get out of education (mostly by retiring).

3. Junior Highs. About 36% of the junior high teachers expected to be doing the same thing in a few years as now. Some 13% aspired to teaching on a higher level, and 10% aspired to an administrative post. Almost 30% expected to get out of education (some 19% of these by retirement).

4. Summary. Females tended to exceed males in their expectations to be doing the same thing in a few years, while males distinctly exceeded females in their expectations to be teaching at a higher level or to be in administration. Some 6-13% of the junior and public senior high teachers expected to be teaching something else as compared to none of the non-public school teachers, and conversely a larger proportion (about half) of the non-

public school teachers expected to be teaching the same thing in the future than do public senior high or junior high teachers. Interestingly enough, apparently none of the non-public school teachers aspired to administrative positions as compared to about 10% in the public schools. However, about 11-13% of all groups would like to teach at a higher level. About a fifth to 30% of each of these groups would like to get out of education, but primarily in each case through the method of retirement rather than changing jobs.

A-8. "How do you expect to accomplish this?"

1. Public Senior Highs. Females tend to omit this question about three quarters of the time compared to half the time for males. However, to some extent this goes with a larger number of females who expect to be doing the same thing in the future, and to some degree it might be assumed that those persons who omitted answering the question probably had no definite plans. In any case, approximately a third of the males intend to achieve their goals by getting an advanced degree as compared to half that many of the females. Some 8% of the males reported that they intend to take Institutes or workshops or keep studying as compared to only 1% of the females.

2. Non-public Schools. Again we have some 70% omits, 18% of the non-public school teachers reporting that they intend to get an advanced degree, and 12% reporting that they intend to attend Institutes, etc.

3. Junior Highs. Again approximately three-quarters of these teachers have omitted this question, and almost a fifth have indicated that an advanced degree is going to be their method of accomplishing their goals. Only 3% talked about Institutes.

4. Summary. Roughly three-quarters of the non-public, junior, and public senior high females omitted this question. Approximately 16-19% of these three groups intend to get an advanced degree. Significantly fewer males omitted the question in the public senior highs, and these are to be found planning to get an advanced degree (one third). The most definite plans for Institutes were in the non-public schools (12%) and for the public senior high males (8%). The other groups were interested in Institutes only to the extent of 1-3%.

A-8a. "Do you find it necessary to devote much time to keeping up with developments in your field? In what ways?"

1. Public Senior Highs. Some distinct sex differences come out on this question. The females exceeded the males in their feeling that there is no need to keep up (23% vs. 5%). On the other hand, the males exceeded the females in feeling that there is a need but in not doing anything about it (17% vs. 1%). This suggests that if the females see a need they take the action, whereas the males perhaps do not. Some 13-16% of the public senior high respondents mentioned that they would be interested in courses, workshops, etc., in keeping up. The most common response, however, is that they will read journals or periodicals, especially for women (36% vs. 26%).

2. Non-public Schools. The question was omitted by the vast majority of this group, and the only significant percentage is approximately 12% who respond that they will do some reading.

3. Junior Highs. For junior highs approximately 13% expressed no need, and 13% felt that courses or workshops would be desirable. About 32% intended to read.

4. Summary. In general, reading seems to be the most popular avenue for keeping up with developments in the field. Taking courses and workshops runs a poor second in most cases. Approximately a fourth to a fifth of the public senior high group either feel that there is no need to keep up or they have no plans to fulfill them. Females tend to predominate in feeling that there is no need. Non-public schools are characterized by a high degree of omit to this question, which makes it difficult to tell whether or not they are concerned or to what extent they are concerned with keeping up in their fields.

B-1. "Are you familiar with NSF Teacher Training Programs?"

1. Public Senior Highs. Approximately a little over a third of both males and females indicated that they are familiar with NSF Programs, however almost a third of females indicated that they are not familiar as compared to only 11% of the males. The remainder of these two groups were partially familiar with the Programs.

2. Non-public Schools. In the non-public schools there is relatively little middle ground. About 45% indicated that they were familiar, but about a third indicated that they were not familiar with these Programs.

3. Junior Highs. In the junior highs the teachers were divided about equally among the categories of familiar, partially familiar, and not familiar.

4. Summary. In general, the greatest percentage of familiarity occurred in the non-public schools, followed by the public schools, and then the junior high schools. On the other hand, there was a very small percentage (about 18%) of the non-public schools which were partially familiar, so that there was about a third of all groups except the public senior high males who considered themselves not familiar with these Programs. Most of the public senior high males considered themselves either familiar or partially familiar, only 11% responding that they were not familiar.

B-2. "How did you first hear about them?"

1. Public Senior Highs. The major avenues of information for the public senior high teachers are through other teachers (21-27%) and through NSF brochures and literature (21-29%), with a few (10%) hearing about the Programs in college. There is little sex difference here, though females tend to hear more than males from other teachers, whereas males tend to get their information more from NSF brochures.

2. Non-public Schools. Two main sources for non-public school teachers are other teachers (26%) and NSF brochures (11%).

3. Junior Highs. Again, the main source is other teachers (23%) followed by NSF brochures and literature and college experiences (10% each).

4. Summary. It would appear from these data that the major source of information for most of these teachers is through other teachers. NSF brochures play a part in the public senior highs, but less of a part in non-public and junior highs. College experiences seem to be of some importance for the public schools.

B-3. "As you understand them, what do you see as the basic purposes and values of the Programs?"

1. Public Senior Highs. The major purposes of the Institutes were seen by the public senior high school teachers as up-dating on subject matter and in broadening subject matter background (14-29%). Females mentioned up-dating more frequently and males mentioned broadening more frequently. Only 7-10% of each group mentioned teaching methodology, and almost twice as many males (35%) gave vague generalizations.

2. Non-public Schools. The non-public schools seemed to place somewhat less emphasis on up-dating and broadening (18-24%), while 14% each mentioned working for an advanced degree and financial aid to teachers. Again almost a fifth were guilty of vague generalizations.

3. Junior Highs. Again, broadening came out slightly stronger than up-dating as the main purpose of Institutes (29% vs. 19%). The junior high group was guilty of some 23% vague generalizations, and 16% mentioned the financial assistance to the teacher.

4. Summary. In all three groups there was a tendency for broadening to be slightly more important in the minds of these teachers than updating, though these were the two main purposes which are offered. About a fifth of all groups were guilty of vague generalizations, with the exception of the public senior high males who raised it to over a third. The non-public schools and the junior high schools seemed more aware of the financial benefits to the teachers, while the non-public schools also mentioned working for an advanced degree. On the other hand, it is the public senior high schools who made some mention of improved teaching techniques as a purpose.

B-4b. "Why did you decide not to apply?"

1. Public Senior Highs. The reason for non-application most frequently put forth was non-relevance, with 44% of the males and 29% of the females mentioning this general area. One of the important sub-categories in this area was teaching in areas other than Math or Science, or planning to, which was mentioned by 10-15%. A second important reason was the general category of "other obligations" mentioned by approximately a third of each

group. This was made up of family responsibilities for the females (23% vs. 2%), but financial problems and responsibilities for the males (16% vs. 1%). The third most important reason, at least for the males, was non-eligibility, where one-fifth of the males answered this way as compared to 6% of the females. This was primarily made up of age or experience reasons. Approximately 10-16% of this group gave reasons which might be classified as low-drive level reasons, and 10-12% noted that their background was inadequate to take advantage of Institutes.

2. Non-public Schools. Again, for this group the big reason, accounting for approximately a quarter of the responses was "other obligations", the most important single aspect of which was family responsibility (12.4%). Twenty per cent of the non-public group responded that they did not apply because of non-relevance of the Institutes to their particular purposes, and some 19% indicated that they were not eligible (primarily because of experiential reasons). It should be noted that 12% of this group indicated they had not applied since application was up to their superiors (again the parochial influence).

3. Junior Highs. The most important reason for non-application for junior highs was non-relevance of the Programs, given by 29%. The vast bulk of this group is made up of those who either teach or plan to teach in other areas (23%). As usual, other obligations are an important reason (marked by approximately a quarter of the group), with some 13% or so mentioning financial burdens as reasons for non-application. Low-drive and inadequate background reasons account for ten per cent of the response each, and approximately 16% of the group feel it is not eligible for Programs.

4. Summary. Non-relevance turns out to be an important reason for non-application as seen by all three groups of schools, particularly the public senior high schools. One of the most important subcategories here for the public schools is the 10-23% who either teach or plan to teach in other areas. A quarter to a third of each of the groups gave "other obligations" as a prime reason for their non-application. This was made up more of family responsibilities for females and for non-public school teachers, and more of financial problems and burdens for male and junior high school teachers. Finally, an important reason for non-application was the feeling that the teacher is non-eligible. This was marked by close to a fifth of each of the groups except the females. A small but important segment of the non-public schools was the 12% who feel that it is not up to them to apply and that such applications should come from their superiors.

B-5. "Have you ever talked with any other teachers who have attended any such Programs? If so, what did they have to say about them?"

1. Public Senior Highs. The modal response for both males and females to this question was a generally positive reaction. However, the males far outweighed the females (64% vs. 43%). There was almost no negative response, but a great number of females as compared to males did not discuss the Institutes with other teachers (40% vs. 16%).

2. Non-public Schools. Similar findings held for the non-public schools, where somewhat under half expressed a positive impression, and approximately a little over a third didn't discuss it.

3. Junior Highs. Again, some slightly under half expressed positive feelings and somewhat under a third didn't discuss it.

4. Summary. The findings seem to indicate that approximately a half or so of each of these three types of schools have a generally positive reaction to these Programs, but that a substantial number (a third or better) did not discuss the Programs with any other teachers. More omits were noticed for the non-public and junior highs, and one could suspect these might be qualified reactions if they were known.

B-6. "We are interested in reasons why teachers might not apply. What ideas do you have about this?"

1. Public Senior Highs. The most important supposed reasons why other teachers might not apply fell under the general category of other obligations again (almost half). Again, the females outweighed the males strongly with respect to family reasons, whereas the males outweighed the females in their concern with financial burdens. Reasons which might be classified as low-drive level, including complacency and wanting summers free, etc., were given by 40% of the males as compared to less than half of this for the females. Non-relevance again came in for a strong mention, primarily by the females (31 vs. 13 per cent) and two of the subcategories in which the females exceeded the males were in having enough education and in nearing retirement. Inadequate background was mentioned by approximately a quarter of the males as compared to 15% of the females, and 12-14% of both groups noted that location reasons might be reasons for non-attendance.

2. Non-public Schools. In these schools the major reasons given for non-application fell under the general category of low drive (45%). It is interesting to note that almost a third of the non-public school group indicated that it felt that people who didn't apply were simply complacent or indifferent. The next most important categories were other obligations, made up about equally of family and financial responsibilities, and inadequate background. About a quarter of the non-public group chose each of these major categories.

3. Junior Highs. In the junior high school group other obligations assumed the most prominent role again, with approximately a fourth mentioning family responsibilities, and a fifth mentioning financial burdens as reasons for non-application. The next most prominent reasons could be placed in the low-drive level category including approximately 10% complacent. Approximately a quarter of this group felt that other teachers would have inadequate background, and a quarter felt that they would not be familiar with these Institutes.

4. Summary. Other obligations assumed perhaps the most prominent role across the board, though more so for public schools than for the non-public schools. Within other obligations it was family responsibilities and

financial burdens which were most important, with females being more concerned with the family and males being more conerned with financial problems. Reasons categorized as low-drive level were important, particularly for non-public school teachers (45%) and for public senior high males. They assumed a lesser importance for junior high and public senior females. Also, in the non-public group almost a third mentioned complacency and indifference as compared to 7-12% in the other groups. Non-relevance cropped up as a reason primarily in the public senior females (about a third) but was mentioned also by males and junior high school teachers to a smaller degree. Somewhere around a quarter of each of the groups felt that teachers would not apply because of inadequate background, and 10-25% across the groups felt that teachers are not familiar enough to apply.

B-7. "In what ways might these Programs, as you now understand them, be modified to fit your particular needs better?"

1. Public Senior Highs. The most important comment here had to do with availability, particularly having Institutes locally. Females were a little more concerned about this problem than males (31 vs. 21 per cent). Some 16-18% of the group mentioned various aspects of the conduct of the Programs, the most important of which was to adjust the level and scope of the Programs to be more suitable. This latter was mentioned more by females than by males. In addition to the above, there were approximately 20-25% who mentioned miscellaneous Program changes, no one of which is sufficiently strong to report.

2. Non-public Schools. Again, approximately a quarter of the group mentioned availability, primarily in local or more convenient Institutes and Programs. Approximately 14% of this group mentioned miscellaneous Program changes.

3. Junior Highs. The junior high school group emphasized the availability aspect in general (approximately 16%) and approximately 10% would like to see night or Saturday Programs. Another 10% or so had some complaints about the application and selection procedures, while a little over a quarter mentioned miscellaneous Program changes. Approximately half of this latter concerns a suggestion to expand the Institutes to other subject matter fields.

4. Summary. In general, it would appear that the most important single Program change suggested by these three groups has to do with the availability of the Programs and includes making them more local and more convenient. Something like 15% to 25-26% of each group mentioned various specific Program changes, the most important of which (mentioned by the junior high schools) was an expansion of Programs to other subject fields. Public senior highs had some comment on the conduct of the Programs, primarily with respect to adjusting the level and content to some degree. The differences between males and females were largely confined to the females exceeding the males in concern over availability of Programs.

C-1. "How does the community around you feel and act toward education and Science?"

1. Public Senior Highs. With respect to the attitude of the parents and community for public senior high schools, it would appear that roughly a fifth or so reported a positive attitude substantiated by some kind of evidence, and something like another fourth or fifth reported a positive attitude not substantiated by evidence (females greater than males on this point), 10-16% being indifferent, and 35-40% being negative. The sex difference does not seem to be particularly important here, but it is interesting to note that some 35-40% of all public senior high school teachers in this Non-Target group appear to feel that the community and parents have something of a negative attitude toward education and Science.

2. Non-public Schools. None of this group gave a substantiated positive attitude. A little less than a third gave a positive attitude unsubstantiated. Almost two-fifths found the parents and community indifferent, and approximately one-fifth felt that they are negative.

3. Junior Highs. In this group approximately a fifth gave a positive substantiated attitude, compared to 29% with an unsubstantiated positive attitude. About 13% feel that the community and parents are indifferent as compared to 13% who feel that they are negative.

4. Summary. There are interesting differences among the types of schools here. A relatively small percentage of junior high schools felt that the community and parents are indifferent or negative (about a quarter). On the other hand, almost three-fifths of the non-public high schools feel that the community is either indifferent or negative, primarily indifferent. This is compared to the public high schools where approximately a half feel that the community is indifferent or negative, but primarily negative.

C-2. "How do your fellow teachers feel and act toward education and Science?"

1. Public Senior Highs. About a quarter of the males and something like 14% of the females felt that other teachers have a positive attitude toward education and Science. Approximately 12-14% felt that the attitude is indifferent, and 8-11% felt that it is negative. The primary difference between males and females here is made up by the fact that the females omitted the question more often.

2. Non-public Schools. Close to half of the non-public schools omitted this question, and close to half of them felt that the attitude of other teachers was positive. There was no indifference expressed and approximately 5% saw a negative attitude.

3. Junior Highs. Again, there was a large proportion of omits for the question, but approximately a quarter see the attitude of other teachers as positive, none as indifferent and approximately 16% as negative.

4. Summary. Allowing for the differences in omits, the findings here are quite similar for the three types of schools. Perhaps less direct negative attitude is seen in the non-public and the junior highs, and certainly there is less indifference in the non-public and junior highs than senior highs.

C-3. "How does your student body feel and act toward education and Science?"

1. Public Senior Highs. With respect to the attitude of the students, 27-30% indicated that they thought the students had a positive attitude, and 43-49% felt that they had a neutral or negative attitude toward Science or education.

2. Non-public schools. These figures are very similar, approximately 38% feeling the students have a positive attitude and almost half feeling their attitude is neutral to negative.

3. Junior Highs. Here approximately a third indicated a positive attitude on the part of the students as compared to approximately a fifth indicating a neutral to negative attitude.

4. Summary. Roughly a third of each of the three types of schools felt that the students have a positive attitude toward education and Science. Close to half of both public senior and non-public high schools indicated that student attitudes are negative to neutral as compared to only a fifth in the junior high schools.

Part Three - Summary

The material below summarizes some of the findings about the Non-target Group in a manner similar to that used in the first part of Chapter VI. It is organized by areas of interest, and the major trends in the data are presented. Again it must be cautioned that in order to achieve a summarization, minor exceptions to the trend have been ignored and the statements made should not be thought of as being true of every individual in the populations.

The Non-target Group was separated from the Target Group under the hypothesis that a large percentage of the teachers teaching Math and Science less than 40% time time would lack identification with the field of Math and Science. Thus it would be expected that a large percentage of the Non-target Group would be Non-applicants. The hypothesis under which the Non-target Group was separated out seems to be supported by the fact that 80-90% of all of the school types included in the Non-target Group are in fact Non-applicants. Since this suggests that the major reason for non-application for this group is lack of identification with Math and Science as a professional field, it should not be expected that a great number of new and significant relationships with application should be discovered. As a matter of fact, this appears to be the case. In general, such relationships with application as are discovered tend to be similar to those already uncovered for the Target Group, but undoubtedly play a less significant role in the present instance because of the more important aspect of lack of identification with the field. A few comments comparing the Target and Non-target Groups are made at the end of this summary.

No school data is presented in this section since the school questionnaire material was not divided up by Target and Non-target Group. The material presented in Chapter III, and summarized in part in Chapter VI, regarding the relationship of school material to application and non-application probably applies almost equally well to the Non-target Group.

Background

Virtually no relationships were found between application and such variables as sex, marital status, age, number of dependents, age of dependents, etc. The Non-applicant teacher here is likely to be about 36 years old in the public schools, or about 44 years old in the non-public schools, and to be married about three chances out of four if in the public schools, and one chance out of three if in the non-public schools. The teacher is likely to be a man, about two chances to one in the public schools, or one out of four in the non-public schools.

Particularly in the senior highs, both public and non-public, these teachers are likely to regard the community atmosphere surrounding them as somewhat negative toward Science and education (almost two-fifths), or indifferent (10-20%). On the other hand, these teachers do not feel that their colleagues are particularly negative or indifferent toward Science and education (only about 5-15% each). Finally, two-fifths to a half of the teachers in the senior high schools tend to feel that the student body is negative, or at best neutral toward Science and education, while only about half as many feel this way in the junior highs. These findings compare fairly closely to the findings for the Target Group.

Educational Background

The findings here exactly parallel the findings for the Target Group. In general, the Non-applicant Group tends to have less graduate training and less training in Math and Science, both on the graduate and undergraduate levels. The AR Group appears to be much more oriented toward education majors than are the Non-applicants or AA's.

Work Situation

The most important finding in this area is that even though this group is restricted on percentage time teaching Math and Science to those teaching in the area less than 40%, there is still a relationship between per cent time teaching Math and Science and application. Also, per cent time teaching other subjects is negatively related to application. These relationships reconfirm the importance of identification with the field as a factor in application. Non-applicants seem to be placed on tenure somewhat less frequently in proportion to the tenure available as compared to AA's and AR's. They tend to have less in the way of extracurricular supervisory duties and a weaker career motivation for secondary teaching and Math and Science teaching. They tend to be making less money than the Applicants. These findings are quite similar to those for the Target Group.

Particularly for males, a substantial percentage of this group entered teaching through fortuitous events, circumstances, or after having begun in some other field. More females than males entered through early desire. However, only 5-14% entered because of an interest in the subject matter, while a fifth to a fourth entered because of the influence of their families. Almost half of the public school females never considered any other occupation, followed by public school males, followed by non-public school teachers, and ending up with junior high teachers where only 13% responded that they never considered another occupation. This tends to suggest that the junior high school teachers are often teachers by active choice and experience rather than by early predisposition. It does not, however, suggest that they are better identified with Math/Science, and probably just the opposite is true.

Activities

As was found for the Target Group, the Non-applicant teacher here tends much more often to mark "none of these" for the list of summer activities than do the other groups. The Non-applicant also tends to hold fewer outside jobs during the year, particularly as compared to AR's. In the summer AA's tend to go to summer school, while AR's tend to hold some non-school job.

Attitude toward Work

Some 20-30% of these teachers indicate that they expect to be out of education in the next five to ten years. However, most of these give retirement as the reason. Women tend more than men to indicate that they will be doing the same thing as now, but only 36-50% indicated that they expect to be doing the same thing. Some 6-12% expect to be teaching something else, and a little more expect to be teaching at higher levels. Thus the teachers here tend to be somewhat less inclined to stay in education and Math/Science teaching than was true in the Target Group. In response to the question about how you intend to achieve your goals, the most significant finding was that about three-quarters of these teachers omitted the question. Of the remaining teachers, getting an advanced degree was the most popular method of achieving educational goals (up to 19%), followed by Institutes, workshops, etc. Reading was the most popularly given method for keeping up with developments in the field, but a number of teachers, particularly public senior high females, indicated that there was no need for keeping up. Approximately 13-16% of the public school teachers indicated that workshops would be a good method for keeping up.

The most important satisfaction in teaching for these teachers was in working with children (some 30-50%), especially in the non-public schools. Other student related satisfactions accounted for the bulk of responses to this question. Dislikes included primarily long hours and heavy teaching load, followed by paper work and salary considerations (males more than females). The females dislike the discipline requirements and record keeping problems more than males, while the non-public school teachers dislike the grading requirements. Junior high school teachers were notable in that they had the least dislikes expressed by the teachers in the Non-target Group. This latter, coupled with the fact that many have never considered any other occupation, would tend to suggest that these teachers are teachers who have sampled the vocational fields and decided that teaching is their "cup of tea".

As was found for the Target Group, it is very clear that professionalism as indicated by belonging to professional organizations (particularly Math/Science organizations), by reading journals (particularly Math/Science journals), and by engaging in various professional activities is quite strongly related to application for NSF Programs.

Self-Concepts

The males in this group emphasized subject matter preparation, and getting students to work as being their main strong points, while females placed emphasis on getting along and personal understanding. Non-public school teachers also emphasized subject matter preparation comparatively more, and 20-25% of all groups mentioned discipline as a strong point. Some 13-16% felt that their teaching methodology and techniques were strong points.

On the matter of weak points as a teacher, public senior and junior high schools mentioned subject matter deficiencies as their greatest weak points.

Only 10-13% of all groups mentioned keeping up to date as being a weak point. Some of the non-public and junior high school teachers mention instructional methods as weak points.

Knowledge of NSF Programs

About a third of these teachers were unfamiliar with the NSF Programs, though females tended to be less familiar than males. The main sources of their information appeared to be other teachers (21-27%), and NSF literature (21-29% for public schools, but only 11% for non-public). In response to the question about the purposes of NSF Programs, subject matter broadening, followed by subject matter up-dating were seen as the main purposes, though a fifth to a third of each group gave vague generalizations. Females tend to mention up-dating more frequently and males tend to mention broadening more frequently. The public schools have comparatively more mention of teaching techniques. Some 14-16% mentioned the financial benefits involved in the Programs.

Attitudes toward Application for NSF Programs

1. Why apply? So few of the interviewees were applicants, that the answers to this question were not analyzed.

2. Why did you not apply? As might be expected, the most important reason for non-application in this group of teachers was non-relevance, a large portion of which was made up of the statement that they were teaching in other areas, or planning to teach in other areas. The second reason for non-application was other obligations, and as in the Target Group, females tended to emphasize family responsibilities, while males tended to emphasize financial responsibilities. The third most important reason for non-application was non-eligibility, and in the non-public schools a number of teachers mentioned that application was up to their superiors. Relatively little information was gained by asking what other teachers had to say about the Programs, since more than a third said that they had not discussed the Programs with other teachers.

3. Why might other teachers not apply? Other obligations were the most prevalent reason here, with males again stressing financial aspects, and females stressing family responsibilities. Non-relevance was mentioned (more by females than males). All groups, but especially the non-public group mentioned reasons which might be grouped under low drive, that is, complacency, indifference, etc. Approximately a quarter of the group mentioned that they felt other teachers might not have an adequate enough background to participate in such Institutes.

Possible Program Modifications

The most important mention of possible Program changes, was in the category of general availability or convenience locally. Junior high school teachers emphasized that Programs should be expanded to include other fields, while adjusting level and content of Programs was mentioned by public senior highs.

Non-target vs. Target Comparisons

The most important difference between these two groups is that the Non-target Group has a substantially higher percentage of Non-applicants than does the Target Group. This is almost certainly primarily because of their lack of identification in the field of Science and Math; even in the Non-target group there is significant relation between application and percentage of time teaching Science/Math. Although non-relevance of the Programs (mostly because of interest in different fields) assumes a more important aspect here than it did for the Target Group, the basic dynamics of non-application appear to be much the same. Other obligations, low drive level, inadequate background (again a function of interest in other fields) seem to be major reasons for not applying.

While there is relatively little difference over-all in the percentage of the Non-target as compared to the Target Group who have had some graduate training, the percentage for the Target NA's is probably significantly higher than for the Non-target NA's. This finding is probably partially due to the restricted age range in the Target Group since a disproportionate number of those eliminated by the age range restriction would have been young NA's without sufficient opportunity for graduate training. However, it is probably still true that the Non-target NA Group is still slightly less self-improvement oriented through further training than even the Target NA's. There is a possibility that many of these teachers, finding themselves split between two or more subject matter fields have not established a sufficiently strong subject matter identification to make further training appear profitable to them.

In summation, it appears that the Non-target Group is not systematically different from the Target Group with certain exceptions which mainly concern its primary identification with other fields. This lack of identification with Math/Science leads it to feel that NSF Programs are less relevant to its own needs and/or requires somewhat more background than it has for application. Non-target Applicants tend to be distinguished by the same sorts of characteristics as hold for the Target Group; namely, professionalism as indicated by membership in Math/Science organizations, better salaries, more training, etc.

VIII. A Final Word

This chapter is intended primarily to present the final conclusions of the staff and some possible recommendations for Program modifications.

First, a word about the Non-target population. As was noted in Chapter VII, the most important difference between the Target and Non-target Groups seems to be that the Non-target Group is less identified with the field of Math and Science teaching. However, the Non-applicants again seem to be those who are less actively aware of their responsibilities in teaching Math and Science. It would be suspected that they are a somewhat lower drive group than the Applicants, and in general seem to have most of the major characteristics of the Non-applicant Target Group, the exception being that they are even less well identified with Math and Science than are the Non-applicant Target Group teachers.

The implications of these findings are that, in general, the personality pattern discovered for the Non-applicant Target Group probably holds reasonably well for the Non-applicant Non-target Group, and the suggestions and recommendations to be presented later in this chapter are probably as valid from the point of view of Math/Science teaching for the Non-applicant Non-target Group as suggestions based specifically on the separate analysis of this group. An additional point, however, is that probably the dissemination of NSF literature and information to teachers in the Non-target Group is somewhat less good than the teachers in the Target Group. It is likely that some more specific appeal emphasizing the important contribution of people who teach Math and Science only a small fraction of their time might, if sufficiently emphatic, get some small portion of these Non-target Non-applicants to apply for NSF Programs.

In addition, there is some suggestion in these data that Institutes in other fields might be appreciated. Thus, if it were possible for NSF to provide Programs in fields other than Science and Math, a number of the Non-applicants in this group might be Applicants.

Comments and Recommendations

The following suggestions are derived from the study and are not evaluated in terms of feasibility within the context of NSF operations. Unless otherwise specified, the comments and suggestions refer to the Target population analyses across all schools.

The personality patterns of the Non-applicants suggest that some changes in the structure of NSF Programs will probably be necessary if they are to attract a substantial number of these Non-applicants. As the persons in the Non-applicant Group do not appear to derive a great deal of their satisfactions from the subject matter aspects of the teaching situation, and as NSF Programs are almost unanimously and uniformly presented with heavy subject matter emphasis, it would appear that the necessary Program changes lie in the direction of presenting Programs emphasizing teacher interactions, the teaching process, and student-teacher interactions in the subject matter areas. It is likely, however, that such Programs will not actually raise the level of the subject matter competency of these teachers to a very great degree, particularly as they would seem to have some real subject matter deficiencies in addition to their generally passive attitude toward the teaching of Math and Science.

It should, of course, be pointed out that the Non-applicant in general tends to be less well informed and less familiar, and the types of schools in which he is found (non-public, junior, and small schools), tend to receive literature less often and less completely than is true for the other schools. Of course the data on this point do not rule out the possible factor of selective forgetting on the part of the responding principals, but these findings seem reasonable. The implications of these findings are that continuing effort should be made to increase the extent and coverage of NSF communications with the teachers.

One of the most powerful influences on application, at least insofar as could be determined from the data, is the recommendation of superior or principal. Now it is quite true that some of the differences in response to principal's recommendations between Applicant and Non-applicant schools could be a function of the response tendencies of the Applicant personality. Thus additional recommendation by principals might be expected to have little effect on those teachers who have not applied. However, it seems more likely that there is a significant portion of the Non-applicant population who would yet be subject to recommendations from their superiors, particularly in the non-public schools where the influence of superiors on behavior of teachers is more direct. While it no longer seems that the Non-applicant is especially dependent upon exterior sources for his motivation (with the exception of a fairly sizeable segment of the female population), there is no evidence to suggest that he may not be responsive to the pressure of recommendations, if they are made sufficiently emphatically by his supervisor. In any case, it does not appear that special efforts to get administrative personnel solidly behind NSF Programs and to get them to make emphatic recommendations would be wasted. On the contrary, they might provide perhaps the largest slice of additional application from the NA's of any procedures suggested herein.

On the other hand, remembering that the Non-applicant population tends to be somewhat less able and somewhat less well trained than the Applicant population, it should be remembered that some of these Non-applicants are going to find themselves in difficulties if they do apply and are accepted for current types of Programs. In terms of academic background and ability, the NA Group was found to be much like the AR Group, which suggests, to the extent that such factors form the bases for selection, that the NA Group might well be rejected even if it did apply. Remembering the small town nature of many of the NA working situations, this could be seen as quite detrimental to a person who likes to be admired, respected and looked up to, particularly if it's spread all over town, as is often the case in small towns. As a matter of fact, this in itself may be a factor which inhibits application among such teachers.

It might be hypothesized that while the Non-applicant actually wishes to avoid attending, his most common response will be that he doesn't feel it is necessary (his intellectual complacency being a subconscious device to screen his real feelings). In any case, the fact that he is less proficient and less able is likely to produce a severe strain on him either before or after he applies for current types of Programs. That is, if his intellectual complacency is not strong he will be aware of his subject matter deficiencies, and he will be very much hesitant to apply and compete; whereas if his intellectual complacency is strong he will not understand or sympathize with suggestions that he apply. He may be induced to apply if he can be made to feel that this will contribute something to him, but he may then find himself in difficulties personality-wise if when he is accepted and attends his carefully nurtured psychological opinion of his own worth gets somewhat punctured. The upshot of this is that if some of these people can be induced to apply, it may turn out to be detrimental to them in the long run. On the other hand, if Programs offering less demanding work were introduced, the implied threat in attendance should also be reduced.

Since the primary concern of the Non-applicant seems to be in the teaching relationship, and since he tends to be intellectually complacent and not to see clearly the need for this type of work, appeals to him in literature about developing children for tomorrow and other appeals slanted toward what can be done, not for him, but for the students on whom his focus rests, may be more successful than appeals about improving his subject matter competency. Even more likely to be successful will be appeals which imply that attendance will make teaching a more gratifying experience for him.

Another suggestion grows out of the fact that while additional education of one form or another is seen as the best way to achieve personal goals, such as advancement or salary advancement, by almost all the teachers, NSF apparently is not seen as additional education. That is, NSF Programs rank a very poor fourth behind getting additional credits or getting an advanced degree as a salary factor, and also run very poorly behind getting advanced educational work in achieving personal educational goals. Thus, NSF must work on producing an image of its Programs as "further formal education".

It might well be possible for NSF to further encourage Institutes and the universities to allow credit or credit equivalents for attendance at NSF Institutes and Programs. If it is possible to develop the image of NSF Programs as additional advanced education, attendance may then be seen as a salary factor and thus will look considerably more promising to many teachers. The Non-applicant teacher does not seem to be as complacent about his salary as it appeared in the Preliminary Analysis. It is quite likely that if he felt that attendance at NSF Institutes ranked equally well with getting additional credit or an advanced degree as a factor in increasing his salary that he might feel impelled to attend. Even though his self-improvement drive via education is somewhat less strong than that of the Applicant Group (in accordance with his low motivational level), this method appears to be the second most favorable thing to try in attracting the Non-applicant population. It is felt that this procedure might well keep away some Non-applicants whose fear of the competitive situation might be heightened by the universal attaching of degree credit to NSF Program attendance, but it is believed that there would be a net gain in application through this factor.

Non-applicant teachers may be hypothesized to have a basic personality conflict about their self-perceptions. On the one hand, they tend to perceive themselves as having everything they need and being competent to the point that is necessary; on the other hand, they also perceive themselves as being subject matter deficient. It is quite likely that application, or the situation of being asked or required to apply would tee off this basic personality conflict and produce considerable uncomfortableness in some Non-applicants. To some degree this problem could be alleviated by reducing the subject matter level of the Program and/or by stratifying Programs into levels where the perspective applicant knows that he is going to be in a group which is consistent with his own training and background, and he is not likely to be overwhelmed. Some lower level Programs might be done on a non-degree basis with reduction of standards so that there would not be a high degree of threat in either applying or attending. Product goals such as syllabi, lesson plans, etc., might be attractive outcomes of such a Program. Other Programs might be set up to concentrate on teaching the slow learner Math/Science. Such Programs should be less threatening to the less well prepared teacher but also challenging to his interests in students.

The stratifying of Programs might be done either in terms of ability level or in terms of the type of background of the teacher. For example, Programs composed strictly of small town teachers might be made up. This might be especially effective with the group of Non-applicants as discovered by this study. It should be remembered that just the mere fact of applying represents to some extent staking the emotional well being of the teacher on being accepted, particularly for the teacher with the type of personality that we are talking about (likes to be admired, respected and finds main satisfactions with people rather than subject matter). This would be particularly true of teachers coming from small towns or small schools where they are known by the rest of the faculty, the town, and the student body. In such situations the fact that a teacher has applied and been rejected quickly becomes known and constitutes a source of embarrassment and disgrace to the teacher regardless of what the objective reasons for rejection may have been. Many of the teachers in the Non-applicant Group are likely to perceive the situation this way, whether or not it is this way in truth. Perhaps if some of these teachers were able to make their applications without the knowledge of superiors and colleagues, more would be encouraged to try.

Other types of separate Institutes might be those for non-public school teachers who have been shown to be somewhat different in character and in dynamics than those in public schools, or those for junior high school teachers who are also different in some respects. Non-public school Institutes might be designed with the thought in mind that application is much more dependent upon superior's recommendations here, and that in many cases the teacher may be motivated through his relationship to some other job such as being a priest or a nun.

Junior high Institutes should be subject matter oriented, but at a lower level. It is not that these teachers don't need subject matter background, but that they are teaching at a level that does not tend to attract teachers who are highly prepared subject matter-wise, or even very professional with respect to the subject matter field. It is a truism that the better prepared teachers in the subject matter fields tend to teach at higher levels. From this standpoint, then, the junior high school is working with a number of teachers who are at relatively low subject matter competency levels, and the educational dictum of beginning where the student is in his preparation should also hold here.

Another thought along these lines is to offer occasional Programs designed primarily for women and in each case made as close to their location as possible. It is likely that the insistence by women on Program modifications along the lines of more local, more available and more convenient is primarily a rationalization, but such changes should be considered.

A final suggestion along the lines of differentiated series of Programs, concerns an idea put forth in the Preliminary Report, namely, the use of the techniques of programmed learning. Again let us keep in mind the type of teacher we are dealing with in the Non-applicant population. He is a low drive level type of teacher. This means that he is unlikely to want to venture forth very far, physically as well as intellectually. As a matter of fact, occupationally he has not been very venturesome; he has hit upon teaching fairly early and stayed with it. He has not been venturesome salary- or stipend-wise in that the evidence suggests that if he has a summer job lined up, or if he has some position that he has been working on for the last several years, he is not likely to give it up even if the NSF stipend is greater, because "a bird in the hand is worth two in the bush". In addition to this he is primarily student-oriented rather than subject matter-oriented, and finally, he tends to be somewhat complacent with respect to his abilities and his knowledge--that is, he may tend to feel that NSF Programs are good things, but that they are not really necessary as far as he is concerned.

It is suggested that consideration should be given to setting up a series of Programs in which NSF would provide graded Programs and an inexpensive teaching machine to be used in the teacher's home. This is not proposed as a substitute for current Programs but as an additional possibility under the differentiation of Programs proposed above.

Programmed Institutes would be ideal for Non-applicant teachers from several points of view. In the first place, they might be administered centrally by a special central committee, thus reducing the rigmarole of application, the problems of multiple application, and particularly the competition in selection. Secondly, the problem of competition in doing the work would be reduced. The Non-applicant would not have to get out and pit his subject matter deficiencies against an unknown group. Thus this technique might be particularly appropriate for junior high teachers. In the third place, Programs might be prepared at whatever level desired for the types of applications examined. In other words, the applications could be sorted into several different levels and types, and Programs might be prepared which would be appropriate for each type. A great deal of research background and knowledge in the area of preparing programs has testified to the generality and usefulness of programmed learning as an education technique.

It cannot be guaranteed that it would be a great deal easier to get the current Non-applicant population to apply for Institutes given on the programmed learning basis than for Institutes as now constituted. However, the evidence suggests that it should be somewhat easier. In the first place, besides not having the competitive situation to worry about, it would be much easier to attend,which ought to take care of many of those who have given family responsibilities as a reason for non-application. In the second place, it would be cheaper to attend because the teacher would not have to disrupt whatever preset or long-term plan he might have made for summer or extra jobs. In the third place, even though he is primarily interested in the interactions with the students in the teaching process, he does have some perceived subject matter deficiencies, and it is possible that this method might pique his intellectual curiosity.

Points for Further Study

One deficiency in the design of the present study should be noted. One of the least controlled factors has been the matter of selection criteria employed by various Institutes. These undoubtedly varied markedly. Since they do, the characteristics of the AA and AR Groups must also vary in accordance with the differential selection procedures. In addition to presenting us with groups of non-standard characteristics, differential selection procedures also affect the reasons that applicants apply or don't apply to the extent that they get information from other teachers and from brochures, and so forth, which mention or imply selection criteria. The net effect of this variable is to make the Non-applicants a group possessing somewhat indeterminate characteristics. There appears to have been no way to allow for the effects of differential selection criteria on the present study and conclusions in the absence of detailed knowledge about these criteria. It should be pointed out, however, that it is the feeling of the staff that the major conclusions and findings of the study are probably independent of minor variations in the selection criteria. However more information should be gotten about such criteria for maximum interpretability of data presented in this report and in the Technical Appendices accompanying it.

One final word about the sample and the data is needed. The sample had all the indications of being an excellent one, both of schools and teachers. The information derived from it may well present as complete a picture of our Mathematics and Science teachers as has ever been assembled. It is suggested that NSF may want to give serious consideration to supplementing the present sample with telephone interviews of those who did not respond (for stability) to collecting community information, and to integrating the information already collected with these new items of information into a descriptive study of the national population of Science and Math teachers. (Science and Math teachers could be treated separately as well as together.) Such a study would have the advantage of presenting the demographic characteristics of Science and Math teachers based on a larger, more representative sample than heretofore available. Such information would be important for manpower and training points of view, and also from the point of view of assessing the quality of Math and Science teaching insofar as such quality grows out of the educational training, vocational, and community characteristics associated with the Math/Science teacher population.